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MALIGNANCY IN ADENOMAS OF THE THYROID

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Except for the rare case of the microscopic diagnosis of carcinoma in hyperplastic thyroid glands, it is now quite generally accepted that the origin of cancer of the thyroid is, for practical purposes, in the preexisting adenoma of the gland. While this premise has been repeatedly promoted by us and by many others, there is still a great variation in the reported percentage incidence of malignant disease in the various types of adenomatous goiter, and there is even mild disagreement by some that the incidence of malignant degeneration in adenomatous goiter is such as to make it worth while for a patient or a physician to concern himself with it.

We should particularly like to give credit to Dr. Allen Graham for his interest and persistence in clarifying and promoting the above thesis. His work in connection with malignancy in adenoma of the thyroid has been of inestimable value to everyone who has dealt with this problem and will, we hope, remain a monument to his name.

There are many reasons for the confusion, disagreements and variations in opinions which have been stated and published regarding the problem of the danger of malignancy in adenomas of the thyroid. Consider only the variations in the difficulties of separating discrete adenomas from multiple adenomas of the thyroid in various parts of the country. In our part of the country, along the eastern seaboard, where endemic goiter is not known and multiple adenomatous goiter is uncommon in the native population, the majority of the thyroid tumors will be the discrete, fetal or embryonal adenomas that are true tumors of the thyroid gland. If one lives in a region where multiple colloid adenomatous goiter, really a degenerative disease of the thyroid, is the commoner, the problem will be an extremely complicated one, since a true fetal or embryonal adenoma may be so included in the multiple nodules of this type of thyroid enlargement that it will be impossible to distinguish one type of nodular enlargement of the thyroid from the other.

It has not been easy to convince many internists of the danger of malignant change that exists in adenomatous goiter. This has been understandable in some measure because, in the past, reports on the incidence of malignancy in adenomas of the thyroid were not infrequently made on a general basis, in which were included all types of nodular goiter, rather than on the separation of the discrete from the multiple adenomas. This separation is of extreme importance, as we will show by our figures, in the series of cases reported in this paper of the various types of adenoma and the percentage of malignant growths among them.

CLASSIFICATION

- Grade I
  - Papillary cystadenoma with invasion
  - Alveolar adenoma with invasion
- Grade II
  - Papillary adenocarcinoma
  - Alveolar adenocarcinoma
- Grade III
  - Small cell
    - Compact
    - Diffuse
  - Giant cell
  - Hürthle cell
  - Fibrosarcoma

Another difficulty in convincing many physicians of the real hazards of malignancy, particularly in discrete adenomas of the thyroid, is due to the fact that, especially if the patients live in a region where goiter is not prevalent, physicians have not had the opportunity to see large numbers of patients with malignant thyroid tumors. Therefore, as the result of such a limited experience with these states, they establish a false sense of confidence in the low incidence of malignancy in the type of adenomatous goiter that they have seen. Physicians are often further confused in their impressions of the danger of malignancy in adenomas in their patients by not having accurately differentiated between true tumors of the thyroid gland, the discrete adenomas, and the false tumors, the multiple adenomatous goiters (the variation in the percentages of malignancy in the different types is shown in table 1).

Published reports of the incidence of malignancy taken from the autopsy records of any of the general hospitals on the New England seaboard would be sure

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to create a false impression of the true incidence of malignancy in adenomatous goiter. There is but a limited number of goiters in a community such as this. Much of the pathological study in the past was done in such cases by pathologists who were not particularly interested in or experienced with some of the confusing microscopic discriminations as to what is and what is not frank or potential malignancy of the thyroid, and much of the material was put in an undifferentiated group of cases called adenomatous goiter, in which the discrete adenoma is not separated from multiple adenomas.

In addition to the above difficulty, one reads in the literature of the incidence of malignancy ranging from low to unbelievably high percentages, explained perhaps by the different types of goiter in the different areas, but at times with such wide differences in percentage figures as to make it impossible for us, with our large experience with goiter, to explain the variations. All these factors have done much to confuse a state which is an important one, one in which it is possible to establish relationships and to deal almost without risk with the lesion while it is precancerous.

TABLE 1.—*Histologically Verified Cancer in Thyroid Nodules*

	No. of Patients	Malignant Tumors	
		No.	%
Single nodule	1,971	198	10.04
Multiple nodules	1,782	11	0.62
Toxic nodules	440	3	0.68
Toxic multiple nodules	735	4	0.54

TABLE 2.—*Known Presence of Thyroid Tumor Before Diagnosis*

Histological Type	No. of Patients	Average Time, Yr.
Grade I		
Papillary cystadenoma with invasion	76	7.4
Alveolar adenoma with invasion	60	8.5
Grade II		
Papillary adenocarcinoma	130	4.4
Alveolar adenocarcinoma	48	10.0
Grade III		
Small cell, compact	40	7.4
Small cell, diffuse	29	2.3
Giant cell	29	8.4
Hürthle cell	7	7.3
Fibrosarcoma	9	0.66
Total	428	

To establish for the benefit of those who have not been deeply interested in thyroid disease and in order to show the importance of differentiation, one has only to look at table 1, in which in a series of 1,971 consecutive discrete adenomas the incidence of malignancy is shown to be 10.04 per cent, while in a series of 1,782 multiple adenomatous goiters the incidence of malignancy is shown to be 0.62 per cent.

We wish particularly to call attention to the fact that table 1 is important in demonstrating that discrete tumors of the thyroid gland are true tumors, whereas many of the multiple nodular or multiple adenomatous goiters are not true tumors but are, as stated above, in reality degenerative processes related in some regions to iodine deficiencies and in others, where iodine exists in the surface water in adequate amounts, to degenerative processes within the thyroid which are not as yet explained.

The distinguishing features of the discrete adenoma in which there has been such a high incidence of malignant disease in our series reported here are (1) its proneness to occur as a single tumor, although it occasionally does occur as two or even three or more tumors; (2) the fact that it possesses a definite capsule with a thick wall, which is obviously a true tumor capsule; (3) the fact that the thyroid tissue within this thick-walled, definite capsule exists in varying degrees of differentiation, from solid cell structures with almost complete lack of differentiation up to full and complete differentiation. With the multiple adenomatous goiter this differentiating point does not exist. The latter tumors are multiple, often scattered throughout the gland or scattered throughout one lobe; they often possess capsules which are actually but condensed circumferences of connective tissue; their contents, while often semi-necrotic, are not of the undifferentiated type but evidence, even in the presence of degeneration within the adenoma, complete thyroid differentiation. One of the purposes of this paper is to stress and prove that the hazard of malignant degeneration in discrete adenoma of the thyroid gland is not only real but dangerously high (10.04 per cent).

Where patients with thyroid abnormalities are seen in large numbers, as in a clinic such as this one, we have had the opportunity to accumulate data on such a large group of cases of the various types that we believe it is our duty to present these figures to the general medical public, with the hope that there will be more general conviction of this real danger of malignancy in discrete adenomas of the thyroid.

We have operated on many patients for cancer of the rectum or colon, and we have often said that rarely do they come for surgical treatment without having had, for not inconsiderable periods, clear warnings of what they were probably suffering from. When one realizes that in 70 per cent of the cases of this lesion the diagnosis can be made with the sigmoidoscope, there is cause for complaint about the carelessness with which patients tolerate symptoms which indicate the possible presence of these lesions. The situation today with cancer of the thyroid, arising as it does almost solely in discrete adenomas, is even more disturbing and depressing.

In what field are we so blessed with the possibility of early discovery of the precancerous lesion as in the discrete adenoma of the thyroid? Where do we have the precancerous lesion in the form of a readily palpable nodule, so superficially situated that it can be conveniently and easily diagnosed by palpation? Where do we have an undeniably proved precancerous lesion such as a discrete adenoma of the thyroid, as demonstrated by this series, in which there is such a high percentage of malignancy? Where do we have a lesion that can be discovered so often while precancerous and so successfully removed with practically no mortality and no morbidity?

V 14
1951

It is with the above facts in mind that we have been prompted to report the figures and to stress the need for the earliest possible removal of discrete adenomas of the thyroid gland.

Any doubt as to the soundness of the critical statement made concerning our disturbance over the delay in patients coming to us with cancer arising in adenomatous goiter is amply overcome by the figures in table 2, in which is shown the period of years over which the adenoma had existed before removal. The excision of these adenomas at any reasonable period during the delay period would have avoided practically all of the deaths, uncertainties and hazards associated with the radical operative measures and irradiation treatment procedures necessary for cancer of the thyroid. It can, in fact, almost be said that if every discrete adenoma of the thyroid could be removed in its earliest stages, we would be able to eliminate almost entirely the occurrence of cancer of the thyroid gland.

If one accepts the premise that we have tried to establish in this paper that the real hazard of cancer of the thyroid is in the discrete adenoma, there arise two obviously related questions: 1. At what size should one remove a discrete adenoma of the thyroid? Is it advisable to remove it when it is first discovered, at say the size of a bean, or should one wait until it has become larger? 2. If discrete adenomas appear in young people, how early should they be removed?

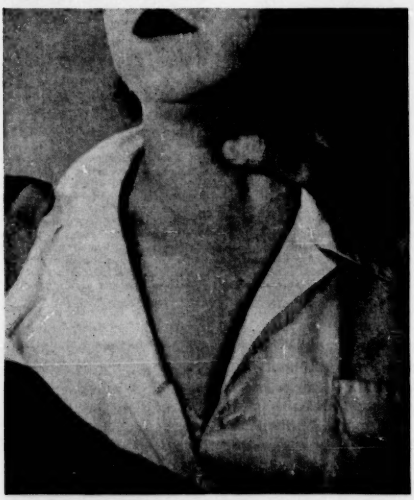

Fig. 1.—Method of dislocating the larynx out of its bed in order to palpate the lobe of the thyroid through and through. The finger pressing the larynx out of its position is applied against the thyroid cartilage where it will not produce coughing or choking. Note how definitely the right thyroid lobe can be dislocated outward for through and through palpation.

If one agrees with the evidence in this paper and in our experience that discrete adenomas of the thyroid are true tumors, it must be assumed that they will never disappear, except as they occasionally disappear by descending into the mediastinum. They will eventually increase in size, and their continuing existence, in the light of the figures reported here, presents a constant danger of cancerous change in them. It is for this reason that we have said that the smaller the adenoma the greater the reason for its removal. This would mean

Fig. 2.—Method of palpating the dislocated right lobe. Note the index finger behind the right sternocleidomastoid muscle, relaxed by turning the chin to the right. The examining thumb is applied over the thyroid lobe in front as the larynx is dislocated to the right by the thumb of the other hand. When the patient is asked to swallow, the thyroid lobe to be palpated ascends and descends between the index finger and the thumb so that it can be thoroughly palpated for a nodule, the consistency that goes with hyperplasia characteristic of hyperthyroidism or the ligneous type of infiltration characteristic of thyroiditis.

less time for exposure of the host to the danger of malignant degeneration. In the past we have reported the occurrence of adenocarcinoma in very small discrete adenomas, not over the size of a small grape. In the same way, if a child has a discrete adenoma, and one subscribes to the reasoning and evidence reported in this article, why should one permit such a child to go through any part of his life with such a hazard? This is additionally true when it has been proved in our experience that the younger the person in whom discrete adenomas occur, with the lesser degrees of differentiation, the higher is the incidence of cancer. For the above reasons we have thought that all discrete adenomas of any size and in patients at any age, once diagnosed, should be removed.

What are some of the diagnostic features of a discrete adenoma of the thyroid as differentiated from the degenerative process of the thyroid called multiple adenomatous goiter? A discrete adenoma of the thyroid is palpable as a single tumor. One must realize that in the palpation of the thyroid gland the procedure shown in figures 1 and 2, which one of us (F. H. L.) devised and published a number of years ago, is of the utmost importance in the diagnosis, since it is usually possible

to determine the presence or absence of even a very small discrete tumor of the thyroid and to differentiate it from multiple adenomas by palpating the thyroid gland through and through with the thumb and forefinger, as seen in figure 2. If one will visualize the procedure illustrated in figures 1 and 2, it will be seen that by this plan the thyroid gland can be so manipulated out of its bed by dislocating the larynx laterally and so palpated with one finger behind the gland and one in front as it ascends and descends with swallowing that the smallest discrete adenoma can usually be plainly demonstrated.

We have often been asked whether in discrete adenomas of the thyroid gland we are able to determine the presence of malignancy by palpation of the thyroid before operation. Except in those patients in whom the cancerous growth has eroded the capsule of the adenoma and invaded the parenchyma of the thyroid, thus producing fixation, firmness and loss of outline of the tumor, we have not been able to make this differentiation preoperatively. We are, however, extremely suspicious of any discrete adenoma which is unduly firm and fixed, but we wish to call attention to the fact that we have not infrequently found this firmness and fixation in adenomas of patients who had had old or recent hemorrhage into them. The occurrence of hemorrhage within an adenoma often accounts for the sudden

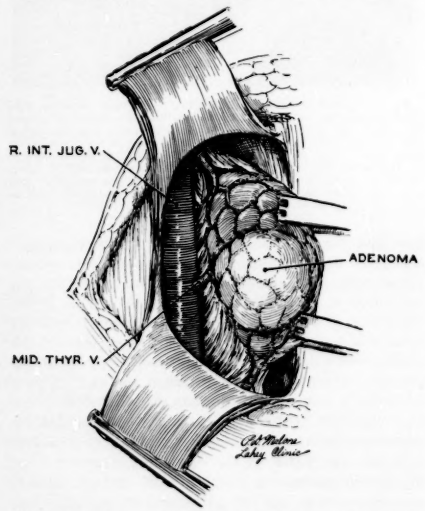

Fig. 3.—Semidiagrammatic illustration showing a discrete adenoma within the thyroid. Note the method of lifting the thyroid out of its bed; note the middle thyroid vein, which will be ligated between clamps and tied so that the common carotid artery can be exposed, the inferior thyroid artery demonstrated and the recurrent laryngeal nerve found and exposed. It is obvious from this type of adenoma which so completely occupies the lobe that the recurrent laryngeal nerve (fig. 4 *a*) as it enters the larynx will frequently be in direct contact with the back of the adenoma and, unless exposed, can easily be injured.

tenderness about which patients complain, but with the gradual disappearance of such tenderness there often remains a high degree of firmness within the tumor, secondary to its overdistention by the hemorrhage within its capsule, and a considerable degree of fixation as the result of the reaction that occurs in the tissues surrounding the capsule of the adenoma.

The surgical treatment of discrete adenoma of the thyroid, particularly after the above discussion, needs

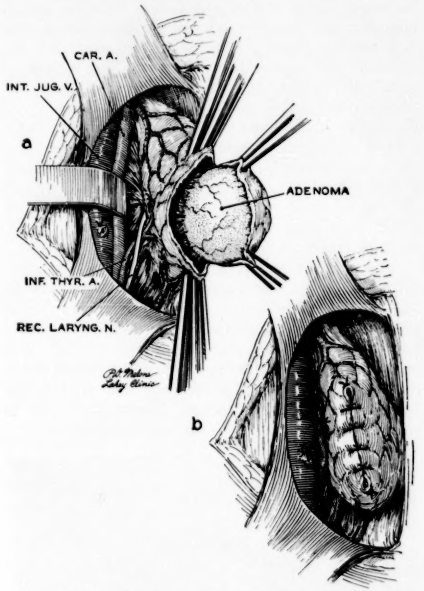

Fig. 4.—Semidiagrammatic illustration showing the method of excision of a discrete adenoma from a thyroid lobe. (*a*) Note the exposure of the recurrent laryngeal nerve and the inferior thyroid artery. Notice the two clamps applied to the good thyroid tissue above the adenoma and the two clamps similarly applied below. The shell of thyroid tissue then covering the adenoma is separated on the outside and around to the opposite side where it is severed. The thyroid tissue beneath the two clamps above and the two clamps below is then ligated with heavy surgical gut and the bleeders controlled. (*b*) The envelope of thyroid tissue remaining on either side is brought together to reconstruct the lobe into an almost normal thyroid. This has proved a very satisfactory method over the years for removing discrete adenomas without sacrificing thyroid tissue.

little comment. While it is evident that we believe that all discrete adenomas of the thyroid should be removed, we should like to add the comment that they should be removed intact and unruptured.

There will be some differences of opinion as to how discrete adenomas of the thyroid should be removed but none, we are sure, regarding the desirability of their being removed unruptured because of the fact that one can never be certain whether or not they are malignant until the pathological report is returned, no matter how harmless the discrete adenomas may appear.

As to the methods of removal, there will be minor disagreement as to whether or not the discrete adenoma should be removed as an individual tumor, as much of the lobe of the thyroid on the affected side as possible being left behind, or whether it should be removed by complete lobectomy on the affected side.

V 14
1951

While our preference is toward local excision of the discrete tumor to await the final report of the pathologist (figs. 3 and 4), we have no disagreement with those who would advocate removal of the adenoma by complete lobectomy. We believe that the decision as to whether a radical neck dissection should be done, often based on whether there is blood or lymph vessel invasion, should be made after microscopic examination of paraffin sections. We should not care to make such an important decision after examination of frozen sections. If the report is such as to justify radical neck dissection, we have no hesitancy in doing it at once; if the report is such as not to indicate a radical neck dissection, we have not sacrificed good thyroid tissue. Our feeling is that we must wait until the microscopic criteria are received on which we settle whether or not a radical dissection of the neck should be done, and so we prefer the former course of the removal of the unruptured discrete adenoma, preserving as much as possible of the normal thyroid tissue until the pathologist's report is at hand (figs. 3 and 4).

TABLE 3.—*Clinical Stage of Disease at Operation*

Stage	Extent
I	Malignant lesions still within capsule
II	Cancerous invasion of surrounding tissue
III	Cancer with lymph node involvement
IV	Cancer with distant metastases (lungs, bone, liver, brain and so forth)

In previous communications we have discussed the evidence on which we base the decision for or against radical dissection of the neck on the affected side, and we have not particularly changed it. We believe that radical dissections of the neck are indicated in all cases of carcinomas arising in discrete adenomas which have eroded the capsule of the adenoma and involved the parenchyma of the thyroid on the affected side. We believe that radical dissections of the neck are indicated for all patients with malignant changes in discrete adenomas of the thyroid, even when they have not invaded the capsule of the thyroid, if they are of grade II or grade III variety, adenocarcinoma or small cell or giant cell carcinoma. We believe that radical dissections of the neck are indicated even in the presence of early carcinomas within the discrete adenomas if they are grade II or grade III, when they have eroded into the lymphatics within the adenomas or when they have eroded into the blood vessels within the adenomas. We believe that radical dissections of the neck are indicated for patients with discrete adenomas with papillary adenocarcinoma without erosion of the capsule but with invasion of blood vessels or lymphatics. We do not believe that radical neck dissections are indicated for patients who have discrete adenomas with papillary adenocarcinoma when there is no erosion of the capsule or no invasion of the blood vessels or of the lymphatics within the adenoma.

When any of the above conditions has occurred, a radical dissection in our experience has consisted of complete removal of the internal jugular vein from beneath the angle of the jaw to the clavicle, with complete dissection of all the node-bearing area of the neck and with complete removal of the thyroid lobe and isthmus on the involved side. The dissection has been carried to the extent that the spinal accessory nerves are completely dissected throughout their course in the neck, as are the phrenic, the vagus, the recurrent laryngeal and the hypoglossal nerves. In addition to the above, the sternocleidomastoid muscle has been removed to facilitate ease of exposure and radicalness of the dissection in all cases, and it has been surprising how little disfigurement has resulted.

Because from the clinical, histological and surgical points of view the diagnosis and treatment of thyroid cancer have been involved with considerable differences of opinion, there has been no unanimity of opinion as to which patients should have radiation treatment following operation and, if treated, how much irradiation should be given. There has been disagreement over the length of time that radiation should be delivered and the quality of radiation that should be used. It would obviously take a large series of cases and several years to determine all these points. From our series of 428 cases with subsequent follow-up studies, the various

TABLE 4.—*Clinical Stage of Thyroid Cancer at Operation*

Histological Type	Total Cases	Stage I		Stage II		Stage III		Stage IV	
		No.	%	No.	%	No.	%	No.	%
Grade I									
Papillary cystadenoma	76	58	76.3	14	18.4	4	5.2	..	...
Alveolar adenoma	60	54	90.0	2	3.3	4	6.6	..	...
Total	136	112	82.3	16	11.7	8	5.8	..	...
Grade II									
Papillary adenocarcinoma	130	68	52.3	34	26.2	27	20.7	1	0.77
Alveolar adenocarcinoma	48	27	56.2	8	16.6	12	25.0	1	2.0
Total	178	95	53.3	42	23.6	39	22.0	2	1.1
Grade III									
Small cell, compact	40	9	22.5	6	15.0	25	62.5	..	...
Small cell, diffuse	29	4	13.8	5	17.2	20	68.9	..	...
Giant cell	29	5	17.2	3	10.3	21	72.4	..	...
Hürthle cell	7	3	42.8	1	14.3	3	42.8	..	...
Fibrosarcoma	9	2	22.2	2	22.2	5	55.5	..	...
Total	114	23	20.1	17	14.9	74	64.9	..	...
Total cases	428								

types can now be evaluated and we hope some of the existing problems clarified.

Our 428 cases of thyroid cancer have been reviewed and classified as to the clinical extent of disease into four stages (table 3). In grade I tumors [illegible]ed as in stage I, comprising 136 cases, the malig[illegible]t neoplasm was still within the capsule in 112, or 82 per cent of the cases (table 4). We have considered it unnecessary to employ postoperative irradiation on those tumors of this grade that have remained encapsulated. When, however, they have shown extension into either surrounding tissue or lymph nodes (approximately 11 per cent of the cases), we have advised postoperative radiation treatment (table 4).

In the grade II tumors (table 4) the histological grading is of the utmost importance, since the relative cure rate between the papillary adenocarcinoma and the alveolar adenocarcinoma varies so widely. The excellent nonrecurrence results obtained in patients with adenomas with papillary adenocarcinoma (grade II) not irradiated have led some observers to believe that surgical enucleation is the sole treatment necessary. These tumors are, however, less likely to remain encapsulated than are the grade I lesions. Papillary adenocarcinomas tend to invade surrounding tissue and spread to lymph nodes more frequently than the grade I tumors. Of 130 cases, the lesion was entirely within the capsule in 68, or 52 per cent, as opposed to 82 per cent of grade I tumors.

After surgical and radiation treatment in this grade (II), there have been eight patients who have had recurrences that have required further surgery or radiation treatment. In five cases, the cancerous growth was so far advanced at the time the patient came to us for treatment that the only surgical procedure possible was biopsy. These patients received only roentgen treatment, and, while there was not complete clinical disappearance of the disease, the group of patients lived and were active for an average of 9.6 years. This indicates two facts: (1) that this type of lesion is a slowly growing one and (2) that these lesions can be quite satisfactorily controlled with adequate irradiation.

We have classed alveolar adenocarcinomas as one of the most dangerous of all malignant thyroid tumors. They are frequently entirely within the capsule at the time of operation—in 27, or 56 per cent, in the series of 48 cases reported here. The five year survival rate in this group has been only 29.1 per cent. This suggests that there has been an early spread of the disease beyond the surgical field and that in spite of postoperative irradiation of the tumor bed, the tumor had not been completely destroyed. Since the amount of radiation (4,800 r) given to these tumors has not been sufficient to stop their growth in all cases, we now believe it advisable, when possible, to increase the quantity of radiation. In order to do this we have improved the quality of the roentgen beam to prevent damage to normal structures.

The present method of giving radiation after operation is shown in the following outline:

1. Radiation therapy is started postoperatively as soon as the general condition of the patient warrants, usually six days.
2. Treatment is planned to cover tumor bed and surrounding lymphatics.
3. It is planned to deliver a total tumor dose of 4,800 r in 28 treatment days (170 r daily).
4. Half-value layer of 2 mm. of copper or better is employed.
5. Moist skin reaction is avoided.

RADIOACTIVE IODINE

Radioactive iodine is useful for two purposes in the treatment of thyroid cancer: (1) as a tracer to determine whether or not any tumor remains; (2) as a curative agent in cases of malignant thyroid tumors that take up iodine (I^{131}) in large enough quantities to destroy the tumor.

The use of radioactive iodine is limited because many of the malignant cells of thyroid cancer will not take up I^{131} and thereby avoid destruction. It is also limited by the fact that metastatic or persisting tumor tissue may assume a different microscopic grade from the original grading.

The iodine uptake of malignant thyroid tumors can be materially improved by total thyroidectomy. Thus, when secondary lesions are present that are being treated by this method, it is advisable to do a total thyroidectomy before treatment with radioactive iodine is begun.

I^{130} and I^{131} have for the most part been used in the treatment of stage III and IV lesions. They are the most difficult of all thyroid cancers to treat satisfactorily. As palliative adjuncts these substances have proved of value largely against tumors that contain a moderate amount of colloid.

CONCLUSIONS

Some of the confusion as to the percentage of malignant changes in adenomas of the thyroid is the result of not reporting the percentage of malignant changes in the discrete adenomas of the thyroid and multiple adenomatous goiters separately.

The incidence of malignancy in this clinic in 1,971 discrete adenomas is 10.04 per cent. This incidence of malignancy in discrete adenomas of the thyroid is too high to justify delaying surgical intervention against such tumors.

All discrete adenomas of the thyroid, however small or however large and even in young people, should be removed as a prophylactic measure against the later occurrence of malignant degeneration in them.

The indications for radical dissection of the neck, followed by high voltage irradiation in cases of adenoma of the thyroid in which cancer is reported, are presented.

As the result of our study and experience with 428 patients with cancer of the thyroid gland, it has been made evident to us that the five year survival rate without recurrence of the disease is very definitely correlated with whether or not the malignant neoplasm is entirely

V 14
1951

within the capsule at the time of the removal of the discrete adenoma. It has further been made evident to us that the number of patients with discrete adenomas of the thyroid in whom the cancerous growth is entirely within the capsule of the adenoma decreases very definitely as the grade of malignancy increases. These facts further justify the early and universal removal of all discrete adenomas of the thyroid.

Prophylactic removal of all discrete adenomas would do much to lower, if not abolish, the occurrence of cancer of the thyroid.

ABSTRACT OF DISCUSSION

DR. ROBERTSON WARD, San Francisco: Too much emphasis cannot be placed on separating the sheep from the goats in the problem of malignant goiter. In general, the enemy is the nodular goiter. Now the task has become a recognition of the subgroups of nodular goiter at which the finger of suspicion should be pointed. Ranking highest in these subgroups is the solitary or discrete adenoma. Our statistics bear this out. During 20 years, 1920 through 1934 and 1945 through 1949, when our solitary adenomas were classified on a clinical basis, we had a malignancy rate of 22 per cent (58 of 275 cases). During the 10 years 1935 through 1944, when only those goiters were included which contained solitary tumors by both clinical and pathological classification, the malignancy rate was 15.6 per cent. These figures, comparable to Dr. Lahey's, leave no doubt that solitary adenoma is the principal offender in producing cancer. There are two other subclassifications of nodular goiter for which early surgery is indicated because of the danger of cancerous change. These are goiters in prepuberal children, in which our rate has run as high as 40 per cent in this nonendemic area, and in males, in whom in my personal experience one out of six nodular goiters has proved malignant. Dr. Lahey has stated that he has no quarrel with those who recommend total lobectomy for a discrete adenoma. My plea is for him to take a firmer stand on this issue and insist that there is no justification at any time for an operation less than total lobectomy for a discrete adenoma—that the operation of enucleation, which has been recommended by Dr. Lahey and others, has no place in the surgery of discrete adenomas. He has emphasized removal without rupture of the capsule, but this is not enough when the pathologist returns a report of invasion of the tumor capsule or even of subcapsular malignant changes in the specimen removed. I ask Dr. Lahey this question: Is there any other premalignant lesion or tumor with a 10 to 20 per cent chance of malignant change in which he would advocate removal without including the largest, easily accessible margin of normal surroundiing tissue? I am sure the answer would be "no." I wish to commend Dr. Lahey and his associates in again reemphasizing and exposing this fifth columnist in the war against cancer. Only when its presence and threat are known can proper measures be taken to combat it.

DR. FREDERICK L. REICHERT, San Francisco: Drs. Lahey and Hare are again emphasizing the important fact that practically all malignant neoplasms rising in the thyroid gland are so-called solitary adenomas and, once they are diagnosed, all discrete adenomas of any size and in patients at any age should be removed intact and unruptured. Drs. Crile and Dempsey, before this Section in 1948, felt that firmness and difference in consistency compared with the nontumorous thyroid gland were the most reliable indicators in establishing the suspicion of carcinoma of the thyroid gland. Drs. Lahey and Hare, along with the authors of papers on carcinoma of the thyroid published not only in the last few months but in recent years, have felt that many physicians appreciate neither the importance of the development of discrete adenomas into cancer, irrespective of the age of the patient, nor the importance of their removal when diagnosed. In fact, the more general feeling is that carcinomas of the thyroid gland, as with carcinomas elsewhere in the body, usually begin as a single nodule and become palpable in time. This is brought out by the reported incidence of carcinoma in solitary adenomas of the thyroid as varying from 5 to 25 per cent. The authors have stressed the urgency of early discovery of a nodule in the superficially located thyroid gland. As in the case of the firm discrete nodule palpated in the breast, our best advice to the patient should be similar to that given by Bloodgood for a lump in the breast—a lump in the thyroid is better out than in.

DR. FRANK H. LAHEY, Boston: I am sure we and the discussers are not in very great disagreement; the disagreements are minor if anything. Consider, for instance, cancers of the rectum and whether or not the sphincters should be preserved. We do not argue in public about the technical part, because if we were to do that the matter would get down largely to a personal opinion. We should concentrate on getting the patients early enough so that it does not make much difference which operation is used. If they come late in the course of the disease, no operation is going to cure them. If you like this procedure or that procedure, that is fine. For that reason I am not particularly concerned with the disagreement as to the method of removal of discrete adenomas of the thyroid. I should like to say why we excise adenomas. To my mind, excision better describes what we do than enucleation. We know we cannot depend on the study of frozen sections for diagnosis of malignant disease in these discrete adenomas. The fine points of decision for or against a radical neck dissection must be settled with examination of paraffin sections. We like to leave the gland undamaged or damaged as little as possible after removal of the adenoma for two reasons: First, if the adenoma is benign we like to leave as much of the thyroid as possible. Second, if it is malignant we like to do a radical dissection, which would include ligation of the internal jugular vein under the angle of the jaw and above the clavicle; total removal of the sternocleidomastoid muscle and block dissection of the neck, including demonstration of the spinal accessory nerve, the brachial plexus, the phrenic, vagus, recurrent laryngeal and hypoglossal nerves, and the complete removal of the thyroid lobe on that side. If the gland is not disturbed too much it is easier to find and preserve the recurrent nerve on that side. Some time ago we abandoned the theory that the aberrant thyroid, which we have talked about a good deal, was truly an aberrant thyroid. Drs. Warren and Feldman, at the New England Deaconess Hospital, have reported a series of approximately 56 of our patients who had what was thought to be lateral aberrant thyroid glands, in all but three or four of whom there was a primary malignant tumor in the lobe on that side. These are not lateral aberrant thyroids but are metastatic invasions of the lymph nodes. As to Dr. Reichert's suggestion for total thyroidectomy, we never do total thyroidectomy any more for malignant disease of the thyroid because when this procedure is done for cancer both recurrent laryngeal nerves will frequently be injured. The chance of cure of malignant disease of the thyroid when both lobes are involved is so slight that it does not justify destruction of both nerves and the undesirable consequences. We do a subtotal thyroidectomy on one side and then a tracheotomy in order that we can give these patients high voltage roentgen therapy to any extent we wish. If a tracheotomy is not done and there is invasion of both lobes and the isthmus with cancer and then high voltage roentgen therapy is given, the reaction in the malignant tissue following roentgen irradiation can so constrict the trachea that an emergency tracheotomy will need to be done. This can be a very difficult and dangerous technical procedure in the presence of malignant tissue reacting to roentgen radiation. We have learned that when malignant disease involves both lobes, the best results are obtained when the trachea is exposed by removing one lobe and the isthmus and a tracheotomy is done. Then tracheal obstruction cannot occur during radiation therapy.

INFLATION OF THE STOMACH WITH DOUBLE CONTRAST

A ROENTGEN STUDY

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In recent years, with the nationwide development of various programs for roentgen examination of the stomach in apparently well persons, the problems inherent in the roentgen diagnosis of gastric lesions have become intensified. In our own hospital we have two such programs: One includes routine periodic roentgen examinations of the stomach on all patients over the age of 45 years with histamine achlorhydria [1]; in the other, gastrointestinal examinations are performed under certain conditions on well persons in a cancer detection center.[1] With the increasing utilization of routine roentgen examination of the stomach in asymptomatic patients,[2] the diagnosis of small lesions has become much more pressing than formerly. More small lesions or possible lesions are being discovered by virtue of the increased number of examinations and increased attention to apparently minor changes. The correct interpretation of such minimal findings presents a grave responsibility. The problem is not a new one but it has taken on a new significance. It has become more and more apparent to us that the routine method of roentgen examination of the stomach is at times inadequate for the identification of certain gastric lesions. When lesions 1.0 cm. or less in diameter are under consideration, especially when the roentgen observations present the only indication for radical surgery, the necessity for the most exacting type of examination becomes readily apparent. In such cases, the addition of any procedure that would add to the accuracy of diagnosis should be especially welcome.

There are many difficulties associated with the interpretation of roentgen findings in examination of the stomach. We shall deal particularly with problems in diagnosis produced by large gastric rugae. One is the difficulty of differentiation roentgenologically between prominent gastric rugae seen on end and gastric polyps. A second is the correct interpretation of large rugal folds that when grouped together locally, although actually benign, may simulate carcinoma or sarcoma.[3] A third is the differentiation of diffusely enlarged folds from such processes as lymphosarcoma or other types of lymphoblastoma.[4]

The importance of identifying the gastric polyp is well established. The role of the gastric polyp as a precursor of carcinoma is widely accepted; the literature on this subject has been previously reviewed.[5] In patients with pernicious anemia, particularly, the importance of this statement cannot be discounted. It is true that many small polyps of the stomach never change in size or characteristics, but there is no means available at present for determining which will remain unchanged. Moreover, even small polyps may cause such symptoms as nausea and vomiting, bleeding from the gastrointestinal tract and anemia. The necessity of differentiating carcinoma or other organic lesions from simple enlarged folds need not be discussed.

The usual methods of roentgen examination of the stomach, consisting of observation and manipulation of the stomach under fluoroscopic control, spot films with and without compression and routine films, will permit a conclusive diagnosis in the majority of cases. Too often, however, these methods fail in such instances as described above. At times, gastroscopy, summoned to aid, may not be able to provide the answer.

In an effort to improve this situation, it occurred to us that with adequate distention of the stomach with air, the walls of the stomach having previously been coated with a barium sulfate preparation for double contrast, normal but prominent rugal folds simulating polyps might be flattened so as to disappear, whereas actual polyps of solid tissue, projecting into the lumen, might remain unaltered. By the same mechanism, it is also conceivable that localized or generalized giant rugae of no apparent significance might be flattened, whereas tissue actually infiltrated and constituting a true mass, or a tumor-invaded wall, would remain unchanged. Furthermore, it appeared that it might be possible to demonstrate stiffening and nonpliability of the gastric wall in certain cases of flat infiltrating carcinoma.

The concepts of air insufflation of the stomach and that of double contrast studies are not new. Various modifications of these technics have been used for many years. Feissly,[6] in 1930, described a method of double contrast in which he used a barium salt and an effervescent solution to generate gas for study of mucosal relief. In 1932, Duval and Béclère [7] (who together with Roux had previously, in the late twenties, already described an air insufflation method [8]) in a very excellent article describe their experience with air insufflation of the stomach. They present striking illustrations that show distention of the stomach with air as a means of better outlining the extent of intragastric tumors and as a means of differentiating between carcinoma and multiple polyposis. They especially emphasize the

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2. Rigler, L. G.: Roentgen Examination of the Stomach in Symptomless Persons, J. A. M. A. **137**:1501-1509 (Aug. 21) 1948.

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5. Rigler, L. G., and Kaplan, H. S.: Pernicious Anemia and Tumors of the Stomach, J. Nat. Cancer Inst. **7**:327-332, 1946-1947.

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8. Duval, P.; Roux, J., and Béclère, H.: La pneumo-gastrographie, Arch. d. mal. de l'app. digestif. **18**:241-251, 1928.

V 14
1951

demonstration of the pedicle in the diagnosis of polyp. Insufflation is carried out through a stomach tube to a point just below "painful fulness." No mention is made of preliminary administration of barium, although barium can be seen in at least one illustration. Roentgenograms are taken with the patient erect, supine and suspended by the feet. In 1937, Lysholm [9] published a very instructive article on gas filling of the stomach by the use of effervescent powders. This he employed as an aid to the general routine examination. The illustrations he presents show remarkable distention of the stomach with gas. Barium was not used. He felt this method gave information of intragastric lesions, such as polypoid tumors, tumors of the greater curvature, and very small polyps. He stated that the thickness and softness of the stomach wall and the extent of pathologic involvement of the gastric wall could be determined by its pliability.

In 1938, Delort [10] reported two cases of greater curvature carcinoma, somewhat doubtful by routine examination, but made quite definite after distention of the barium-coated stomach with air. In 1941, D'Eloia,[11] in this country, described the use of an inflated intragastric balloon for distending the stomach and obtaining contrast. He weighted the balloon with water as a ballast. For the antrum he had a special tube with two balloons, the smaller of which was at the tip of the tube. This was passed through the pylorus and weighted with water to act as a ballast. He speaks of demonstrating early carcinoma by loss of elasticity of the stomach wall. Le Canuet, Lapipe and Pichard,[12] in 1946, described a technic using an intragastric balloon after administration of barium; their interest lay in demonstrating posterior and anterior wall ulcers and studying the rugal folds of the proximal portion of the stomach and the cardia under massive distention. In the same year, Albot, Le Canuet and Berthel [13] report on using a stomach tube for air insufflation and double contrast examination of the cardia and fundus for the study of lesions of these areas and of the greater curvature as well.

Others, in this country, have advocated the use of the double contrast method in roentgen examination of the stomach. Colcher [14] has emphasized mainly the demonstration of the mucosa in double contrast relief. Poppel,[15] using effervescent powders to generate the gas for the air contrast purposes, achieved moderate distention of the stomach and felt that the method was of value in demonstrating lesions, mainly in those cases in which the routine examination of the stomach repeatedly failed to disclose abnormalities. Kirklin has emphasized the value of the gas bubble, as seen with the patient upright, in outlining tumors of the cardia.[16] Wasch and Epstein have distended the cardia with air, following passage of a Levin tube, for the purpose of demonstrating lesions of this region.[17]

Recently, Pirkey [18] has described a method of distention of the stomach with an intragastric balloon after completion of the routine examination of the stomach. With this technic he is able to flatten large benign gastric rugae and presents excellent illustrations of such cases.

The technic of the method herein presented has been described in detail in a previous communication.[19] It is a procedure which is by no means intended to replace the ordinary method of stomach examination. Better contrast and definition can be obtained, as a rule, with the opaque meal than with the double contrast technic that is a part of the insufflation procedure. The double contrast feature, however, is not primarily intended. What is intended is that by air distention of the stomach flattening of prominent but otherwise normal folds will be achieved and abnormal tumor masses alone will remain prominent. The procedure is a supplemental examination used only in selected cases after the routine examination has revealed abnormal or questionable findings that might be further clarified by such a maneuver.

The insufflation procedure may be carried out the day of the routine examination after the stomach has emptied approximately 50 per cent, or preferably it may be done on another day to prevent barium in the small bowel from obscuring the field. In the latter case, the usual preparation for gastro-intestinal study is carried out. A stomach tube is then passed. Coating of the stomach wall is accomplished with a single swallow of thin barium mixture, before the air is introduced. At this time the stomach walls are still in contact, so that barium can be worked by manipulation, under fluoroscopic observation, into the furrows between the folds. As soon as coating is complete, the patient is placed in the supine position to prevent, if possible, escape of barium into the duodenum which might obscure subsequent radiographs. From 500 to 1,500 cubic centimeters of air, or more if tolerated, is then injected, by means of a 100 cubic centimeter syringe, into the stomach. The injection is continued until the patient complains of a definite fulness but it should not be painful. The patient is constantly questioned as to the degree of fulness he experiences, and spot checks are frequently made fluoroscopically in order to prevent overdistention. Spot films are taken immediately after injection since there is a tendency for the patient to eructate (in spite of his attempts to avoid this) or for the air to escape into the duodenum. For demonstrating the body of the stomach and antrum, the Trendelenberg

9. Lysholm, E.: Gas Filling of the Stomach and Duodenum as Aid in Their Examination, Acta radiol. **18**:259-262, 1937.

10. Delort, M.: Difficultés et précisions de diagnostic radiologique, Arch. ital. di chir. **51**:623-626, 1938.

11. D'Eloia, A. S.: Pneumogastroscopy: A Preliminary Report, Am. J. Surg. **53**:280-283, 1941.

12. Le Canuet, R.; Lapipe, M., and Pichard, R.: Une technique d'exploration radiologique de l'estomac: La compression par ballon intragastrique, Arch. d. mal. de l'app. digestif. **35**:460-462, 1946.

13. Albot, G.; Le Canuet, R., and Berthel, G.: Le transit oesophagien avec insufflation gastrique: Méthode d'étude des lesions cardio-tubérositaires, Arch. d. mal. de l'app. digestif. **35**:538-542, 1946.

14. Colcher, A. E.: New Displacement Technique for Study of Mucosal Relief—Preliminary Report, Radiology **29**:615-620, 1937.

15. Poppel, M. H.: Double Contrast Method in Roentgenography of the Gastrointestinal Tract, Am. J. Roentgenol. **37**:379-381, 1937.

16. Kirklin, B. R.: Roentgenologic Diagnosis of Cancer of the Cardia, Am. J. Roentgenol. **41**:873-878, 1939.

17. Wasch, M. G., and Epstein, B. S.: Roentgen Visualization of Tumors of the Cardia, Am. J. Roentgenol. **51**:564-571, 1944.

18. Pirkey, E. L.: Double Contrast Roentgenograms of the Stomach, Am. J. Roentgenol. **62**:70-74, 1949.

19. Ruzicka, F. F., Jr.: Early X-Ray Diagnosis of Stomach Tumors, Bull. Univ. Minnesota Hosp. & Minnesota M. Foundation **20**: 660-669, 1949.

position (10 to 15 degrees) supine, and also supine with the right side raised to varying degrees, is used. The fundus and cardia are best demonstrated with the patient in the upright position. If air is lost, further injection may be safely made to keep the stomach well distended. If a routine barium meal study has preceded

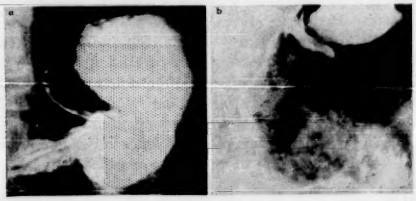

Fig. 1.—*A*, normal stomach as seen in the usual posteroanterior view. Stippling indicates part of stomach shown in *B*. *B*, spot film of body of same stomach, including region of cardia (but not fundus) as it appears when coated with barium and distended with air. Rugae are well flattened with the increase in diameter of stomach. Patient is in supine position and view is posteroanterior. Incisura angularis remains distinct. Stomach wall appears soft, pliable and billowy. Note tube projecting into lumen of stomach from esophagus. Some barium has escaped into the small bowel.

the stomach inflation, the remaining barium can usually be shifted out of the field of interest by the various positions which the patient assumes during the examination.

An example of a normal stomach coated with barium and distended with air is illustrated in figure 1. The rugae are well flattened and largely obliterated, and

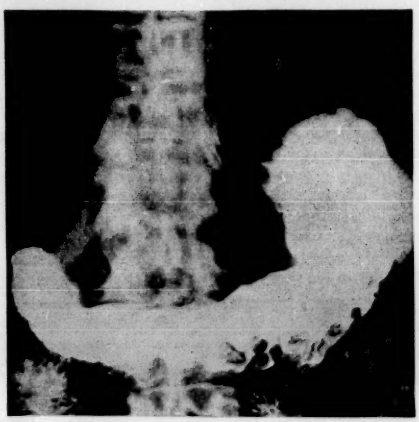

Fig. 2.—Case of known gastric polyposis, conventional posteroanterior view. Note numerous defects representing polyps. Diagnosis confirmed by gastroscopy.

the stomach wall has a soft and pliable appearance. A thin layer of barium covers the mucous membrane. *En face* it appears more or less homogeneous depending on the smoothness of the coating. In profile the barium appears as a dense line along the stomach wall.

Polyps coated with barium in the air-distended stomach are rather characteristic in appearance. At times, especially when it is quite large, the polyp may appear as a more or less homogeneous density with a dense shell-like periphery. Often, however, especially with small polyps, only an outline is seen—an oval or circular ring of density. A roentgenogram from a known case of polyposis of the stomach, verified by gastroscopy, is presented in figure 2. Multiple defects, representing polyps, can be seen in the body of the stomach in the conventional film. The same stomach is shown in figure 3 *A* after barium coating and air inflation. The adjoining sketch, figure 3 *B*, is a drawing of figure 3 *A*, intended to set off the polyps in more pronounced relief. The circular and oval rings of density, at first not readily discernible, become more obvious as one learns to recognize them. The rugae have been flattened, and only the polyps remain projecting into the lumen.

A typical example of the difficulty of differentiation by routine examination between large rugal folds and polyps is demonstrated in figure 4 *A*. In this case, small rounded defects are visualized in the antrum. In some of the films of the routine examination the defects

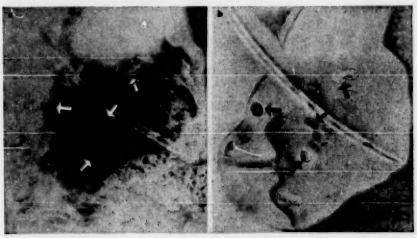

Fig. 3.—Same case as in figure 2. *A*, spot film of stomach distended with air to obliterate rugal folds and demonstrate polyps. *B*, drawing from tracing of *A*. The sketch makes it possible to recognize more readily the sharp oval and circular rings of density which represent polyps in the air-distended stomach. Not all the polyps are included in the drawing, some being omitted for purposes of clarity.

appear somewhat elongated, appearing to merge with the folds. In other views they appear somewhat more discrete like polyps. After air insufflation (fig. 4 *B*), the problem was resolved by the demonstration of faint but distinct, sharp, circular densities in the antrum. These represent polyps. The adjoining sketch (fig. 4 *C*) points up the polyps for illustrative purposes. Subsequently the diagnosis of gastric polyps was verified by gastroscopy.

An extremely interesting case encountered was one in which large rugae were present in the body of the stomach, together with three polyps. From fluoroscopic observations and inspection of the routine films it was thought that if a polyp were present at all it was at the site of the largest of the defects visualized. Air distention of the stomach clarified what was polyp and what was fold. It was found that, although a polyp was present at the site of the large defect, it was not so large as the routine film suggested. A large rugal fold contributed in great part to the size of the defect. Two other clearcut polyps were visualized in the body of the stomach. Their shadows could be seen in the pre-

V 14
1951

inflation films but without the air insufflation one could not be categorical as to whether they were polyps. These tumors were not visualized in two gastroscopic examinations but were seen on a third attempt.

In many of the patients examined by the air inflation method to differentiate between rugal folds and polyps,

Fig. 4.—Gastric polyps demonstrated by air inflation. *A*, cluster of defects (arrows) in the antrum in the conventional posteroanterior view suggests the possibility of polyps. The defects, however, were far from constant and did not appear consistently on all the conventional films. Two different fluoroscopists termed them "large folds." *B*, stomach after air insufflation. Four sharply defined oval densities (arrows) are visible in the antrum and body, indicating the presence of polyps. The study demonstrates that part of the cluster of defects in *A* is due to the two central polyps, but part is due also to adjacent large folds. The two other polyps were unexpectedly visualized. This method makes possible a sharp differentiation between polyp and fold. *C*, sketch of the same area emphasizes the polyps for illustrative purposes. Presence of polyps was verified by gastroscopic examination.

the presence of gastric polypi has been demonstrated. In other cases, however, it has been possible to disprove the presence of polyps by distending the stomach with air and flattening prominent folds that in the conventional examinations had simulated polyps. A patient with such a condition (fig. 5) was examined in our cancer detection center because of achlorhydria found on gastric expression. Multiple rounded defects were visualized in the body of the stomach by means of films made with compression (fig. 5 *A*). Opinion was divided among several observers as to whether or not polyps were present. After air inflation the folds were completely flattened and no polyps were to be seen projecting into the air-filled lumen (fig. 5 *B*). The defects seen in figure 5 *A* are presumed to be due to prominent but otherwise normal rugae seen on end.

The air inflation procedure has been marshalled also as an aid in evaluating the postoperative gastric pouch in cases in which subtotal gastrectomy for gastric polyposis or carcinoma has been performed. Not infrequently various types of defects are encountered in the gastric pouch near the site of the gastrojejunostomy and in most cases are secondary to the surgery. Nevertheless, the presence or absence of polyps or recurrent carcinoma must be definitely established. We have been able with more assurance to identify these defects as surgical deformities or establish the presence of polyps by the employment of the air insufflation method.

In addition to the more certain detection of polyps, we have used the method of inflation with air contrast as an aid in differentiating between localized giant rugae made prominent by physiological contraction of the muscularis mucosae and folds actually infiltrated by tumor or tumor presenting the appearance of giant rugae.

Masses in and about the cardia lend themselves fairly well to this type of examination. The cardia and fundus are regions of the stomach that have been the most thoroughly studied by air contrast and air distention methods.[20] One must differentiate between extrinsic masses and tumors actually within the stomach. But even when the latter decision is reached, one cannot rest content with the diagnosis of gastric carcinoma in all cases in which a soft tissue density is seen protruding into the stomach air bubble. Occasionally redundant mucosa associated with hiatal hernia will produce the appearance of a mass in the cardia. The experience of reporting a mass in this region and the finding of no lesion whatsoever at surgery undoubtedly befalls every radiologist sooner or later. It has been possible, in one instance, with adequate air distention of the cardia and fundus to dispel completely the appearance of a mass when no true mass existed. On the other hand, in a case in which a true mass was present, its outline persisted in the presence of marked air distention. With air distention of the fundus, one must be careful, however, not to lose a true mass in the overdistended stomach. Reference will be made to this point later.

Enlarged rugae along the greater curvature when localized and markedly prominent have long been a problem in roentgen diagnosis. Carcinoma or lympho-

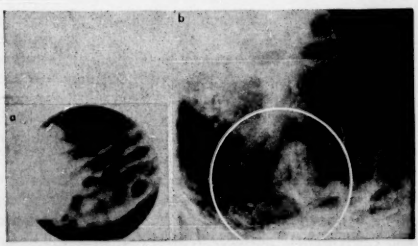

Fig. 5.—Enlarged gastric folds simulating polyps. *A*, an area of the midportion of the body of the stomach is seen in this spot film taken with compression. Two different well trained fluoroscopists considered the defects to be polyps. *B*, air inflation film reveals no evidence of polyps. White circle indicates area of body of stomach seen in *A*. The defects in *A* are presumed to be on a basis of rugae seen on end. Gastroscopy could not be done.

sarcoma may be very difficult to exclude in such instances. In figure 6 *A* is depicted in the conventional posteroanterior view an example of large rugae extend-

20. Albot, Le Canuet and Berthel,[15] Kirklin,[16] Wasch and Epstein,[17] Pirkey.[18]

ing over the proximal half of the greater curvature. When the stomach is distended with air, the large but otherwise normal rugae assume the appearance demonstrated in figure 6 *B*. The folds are still recognizable, but their prominence has been reduced to a point that gives assurance of the absence of an actual infiltrative process. The accompanying sketch (fig. 6 *C*), a drawing of the film seen in figure 6 *B*, brings out the pliability of the folds. On air insufflation the contour and pattern of the area are completely altered by the flattening of the folds. In such cases one may feel confident, we believe, in considering the stomach normal, whereas without the support of the additional study a wavering opinion would ensue.

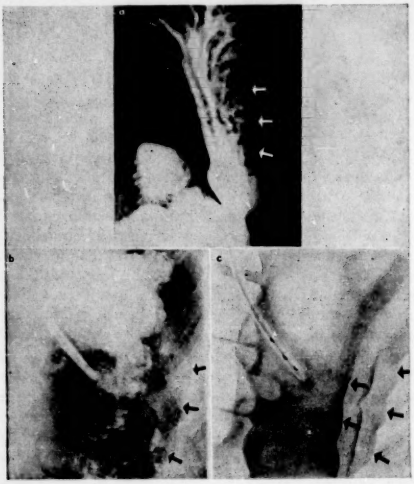

Fig. 6.—Enlarged gastric rugae. *A*, conventional examination showing large rugae along the proximal portion of the greater curvature of the stomach. Note transverse arrangement of rugal folds. *B*, appearance of large compressible rugae flattened by the air inflation double contrast technic. The contour and pattern of the greater curvature are completely altered. Note longitudinal arrangement of folds. The pliability of the gastric wall is readily appreciated. These findings indicate a normal stomach. *C*, drawing made from the film shown in *B* highlights the characteristic appearance of the folds when flattened. Note shelving of greater curvature producing margin of increased density due to narrowed anteroposterior diameter in this area.

Another example of enlarged but compressible rugae is presented in figure 7. A localized irregular defect is present in the midportion of the greater curvature in the conventional posteroanterior film (fig. 7 *A*). In such a situation one must consider the possibility of an actual tumor mass. The air inflation study, however, compresses the localized prominent rugae and permits the greater curvature to assume a smooth, pliable, normal contour (fig. 7 *B*). A narrowed anteroposterior diameter along the greater curvature in this region produces an appearance of shelving, but the evidence of tumor has been dissipated. None of our patients with compressible folds has had surgery, but in a number that have had follow-up examinations at intervals of six months or more there has been no change in the appearance of the stomach. When an actual tumor mass is present, as occurred in one of our cases, it is noncompressible and remains as a definite protrusion into the air-distended stomach.

The method has been employed in two cases of generalized prominence of rugal folds in an attempt to differentiate normal folds from lymphosarcoma or other diffuse organic disease of the stomach with fairly satisfactory results. In one case, flattening of the folds, which were moderately prominent throughout, was achieved, except in the fundus. It was felt, however, that if more air had been injected (which was possible) a more satisfactory flattening of the fundic rugae would have been accomplished. Even so, they presented the appearance of normal, undulating rugae. A second case of very marked, generalized enlargement of rugal folds was examined. In this patient, it was possible by air distention to flatten very effectively the large folds of the body of the stomach and fundus. However, it was not possible to obliterate the rugae of the antrum satisfactorily. Active peristalsis interfered by propelling air into the duodenum. Barium in the duodenum also obscured the area. When a balloon was passed into the antrum and inflated, it was ejected into the body of the stomach. When the patient underwent gastroscopy, the folds throughout were described as enlarged. In the antrum the folds could not be entirely compressed by air insufflation during gastroscopy, but the stomach was pronounced within normal limits. When the stomach is large and the folds quite prominent (conditions which existed in this case), it may be impossible to inflate sufficiently to flatten all the rugae. However, a sufficient alteration can be produced to indicate pliability and at least probable normalcy of the gastric wall.

We have used the air inflation procedure in one case of flat infiltrating carcinoma of the midlesser curvature which came to our attention as a result of a routine examination. This patient was one of the asymptomatic group with achlorhydria which is being studied at this hospital and had had a negative examination one year previously. It so happened that at that time we had chosen to insufflate his stomach for use as an example

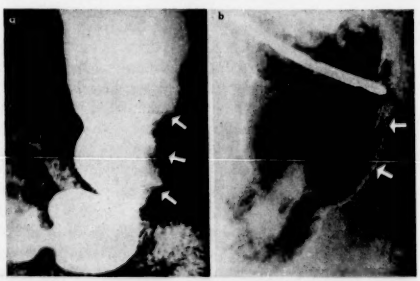

Fig. 7.—Localized enlarged gastric rugae simulating carcinoma. *A*, irregular, localized defect is seen in the middle portion of the greater curvature in the conventional posteroanterior view. Possibility of tumor at this site must be considered. *B*, air inflation dissipates evidence for tumor. Defect was produced by greatly enlarged but compressible and pliable rugae. Contour of greater curvature is now full and smooth.

V 14
1951

of the normal. Films from this original examination are presented in figure 1. The air distention study revealed a completely normal stomach with a billowy lesser curvature, soft, pliable and undulating (fig. 1 *B*). In contrast, an air distention examination performed one year later (fig. 8 *B*), after discovery of the lesion,

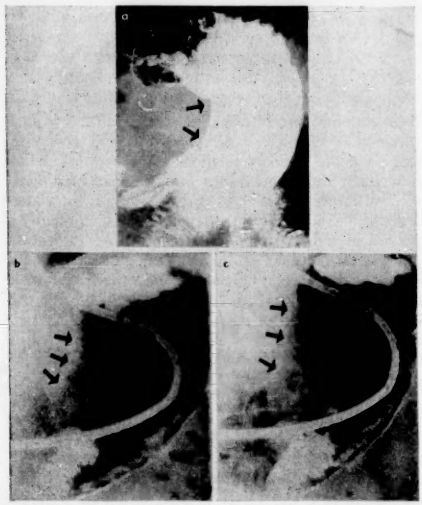

Fig. 8.—Same case as in figure 1. *A*, note change in lesser curvature appearance in conventional films as compared with examination made one year previously and depicted in figure 1 *A*. The segment of lesser curvature above the angularis is now shortened and stiffened. This appearance was repeated in multiple films. *B* and *C*, air inflation confirms impression of infiltrated, nonpliable lesser curvature. Compare present stiffened appearance with soft, billowy appearance in figure 1 *B*.

demonstrated a constantly straightened and stiffened segment along the lesser curvature. The appearance is radically different from that seen in figure 1 *B*. Although the diagnosis of carcinoma of the stomach was considered highly probable from the routine examination alone (fig. 8 *A*), it was reported with much greater assurance following the confirmatory air inflation procedure. Since the patient was completely asymptomatic and radical surgery was contemplated, the additional confirmation given by the air inflation proved to be of great value. The diagnosis was confirmed at surgery.

As with any method of examination, there are advantages and disadvantages. In an evaluation of the worth of the method of air inflation with double contrast it should again be pointed out that it is advocated only as a supplementary procedure to a thorough routine roentgen examination of the stomach. It is of practical use only in certain cases which remain doubtful as to definitive diagnosis after the routine procedure is completed. Although indication for its use is not frequent, it is felt that when it is used in situations such as those described above the avoidance of the undesirable, noncommittal type of report will often be made possible.

While the number of patients examined by this method is not sufficient for statistical purposes, accuracy of the procedure in the differentiation of polyps from prominent rugal folds is, we believe, reasonably good. Twenty-five patients have been examined for the purpose of differentiating polyps from prominent rugal folds. A number of the diagnoses (about half) have been verified by gastroscopy or surgery. In five instances we were unable to state with reasonable certainty a definite opinion. Three of the five failures were in patients in whom there was question of an antral lesion. In spite of the technical difficulties of adequately distending and visualizing the antrum, we have been able to demonstrate in several instances antral and prepyloric polyps as well as polyps prolapsed into the duodenal cap that gastroscopic examination had failed to bring out.

In 24 other cases insufflation has been done for the purpose of determining the significance of enlarged gastric rugae. A reasonably certain answer was possible in all but three cases.

A number of technical difficulties may be encountered in the conduct of the air inflation double contrast procedure. These in large part account for the unsuccessful attempts cited above. Incomplete experience with the method, we believe, is also partially responsible for the failures. One of the greatest problems is that of obtaining a contrast material that coats the stomach mucosa evenly and completely. Various preparations have been tried. We have found none to be more effective than the ordinary barium meal mixture, which itself is not satisfactory. Too often there is no evidence of coating with barium in the very area under observation.

Another difficulty which interferes with interpretation is the escape of the barium from the stomach into the small bowel. As a rule, this is not usually great enough in amount to interfere seriously with the technic, but it may at times completely obscure the air-distended stomach in the antral and body regions.

At times adequate distention is difficult to attain, either because active peristalsis propels the air into the small bowel, or the stomach or a part of it is so voluminous as to prevent a distention sufficient for the purposes discussed above. Rarely, the capacity of a stomach is so limited that eructation occurs before adequate distention is achieved. In such cases, the method of employing the intragastric balloon may prove more useful.

The antrum is particularly difficult to distend when peristalsis is active. Proper positioning to demonstrate the antrum clearly may be difficult to effect, especially when, as noted above, barium is present in the duodenum.

Distention of the gastric pouch after subtotal gastrectomy or of the fundus of the intact stomach is, as a rule, simple to attain. In examination of either, one must be certain to obtain a sufficient number of roentgenographic exposures in all positions. A case has been encountered in which a mass in the cardia later proved to be present could be visualized only in certain projections. In other views there was no sign of it whatever. Similarly, a large polyp on the greater curvature

of a gastric pouch was lost to view in some films, since it prolapsed into the jejunum under the air distention. In certain other positions it was clearly visible. Patients with subtotal gastric resection and an anastomosis to the jejunum must have the pouch distended in the upright position; otherwise air will escape through the stoma. For this reason, the body and antrum of the stomach in patients with the older type posterior gastroenterostomy cannot be distended with this method. In such cases, use of an intragastric balloon is essential.

The use of the intragastric balloon as described by Pirkey [18] has been employed by us on several occasions. At times, this procedure is necessary for distention of the stomach, as with the posterior gastroenterostomy type of case mentioned above. One significant advantage of the balloon technic is that the inflated balloon, once it is placed, usually remains in position, permitting conventional roentgenograms with the Bucky diaphragm to be made, whereas the insufflation technic necessitates immediate spot films before the escape of air. Our experience with the balloon technic is small, but we feel that it will probably produce about the same results as the air inflation method herein described except for certain disadvantages. In several cases, we have had difficulty demonstrating the antrum by the balloon method because of ejection of the balloon out of the antrum, whereas at the same sitting we have been able to distend the antrum satisfactorily by the insufflation method. Air distention of the duodenal cap is also quite readily achieved by the air inflation method (for the demonstration of prolapsed polyps), whereas it is not practical to attempt with the balloon method.

However, aside from any technical disadvantages of the balloon method, we feel that from the standpoint of practical application in daily roentgenological practice the most compelling reason for using the air insufflation method, if it is technically feasible in the particular case in question, is that patients will accept an ordinary stomach tube much more readily than a tube with a balloon attached. A good deal of unpleasantness is thus avoided. Moreover, passage of the plain tube is quicker, and there is no preparation of the tube required. The procedure in our hands adds about six to 10 minutes to the time spent with the patient during examination.

SUMMARY

A method of air inflation of the stomach with double contrast has been presented.

This method has been used successfully for differentiation between polyps and prominent rugae simulating polyps. It has also been used to differentiate normal benign giant rugae from carcinoma or other types of gastric infiltrative lesions. Pliability or nonpliability of the gastric wall may also be demonstrated.

Its effectiveness, advantages and disadvantages have been discussed.

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ROENTGENOLOGIC EXAMINATION OF THE COLON USING DRAINAGE AND NEGATIVE PRESSURE

WITH SPECIAL REFERENCE TO THE EARLY DIAGNOSIS OF NEOPLASM

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and
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Survey examinations using roentgenologic methods show little promise of revealing many gastric or colonic carcinomas in stages earlier than they are now being seen with the ordinary methods. The inability to find more early neoplasms results from the inadequate technic and the failure of most early neoplasms to produce a distinct abnormality in the pathological-physiological pattern as judged by present technics. All indications point to the fact that the surgeons can cure carcinoma if it is found before it spreads beyond the organ of its origin.[1] If significant progress is to be made, the profession must strive for 85 per cent, or even 90 per cent, survival rates and not be satisfied with 10 per cent, or even 35 per cent, improvement. The problem is primarily one of increased diagnostic accuracy.

Recent experimental investigation on animals suggests that for man a simple serologic test for cancer will be devised.[2] By detecting changes in seroproteins or other blood ingredients, these tests, if done at frequent enough intervals, may reveal the existence of a carcinoma in extremely early stages. Should a simple test be developed, the clinician will be hard pressed to search out the site of the neoplasm and to eliminate the false positive results. There is little hope that such a test will identify the location of the disease other than possibly pointing to a group of organs.[2] Much of the burden of searching out a lesion in the gastrointestinal tract will fall on the radiologist and the endoscopist. Technics must be improved and special procedures devised to uncover the small lesions. More roentgenograms must be taken and less reliance placed on the fluoroscopic observation. Although the fluoroscope has proved invaluable in locating the larger lesions, it has proved inadequate in detecting the smaller. The fluoroscope will continue to be a necessary instrument to guide the making of the films.

In the colon, the field of the radiologist lies above the reach of the proctoscope. No roentgenologic examination of the colon is complete without an adequate proctoscopic examination.

Little effort has been made, other than the introduction of the double contrast method by Fischer in 1923 [3] and developed to a high grade of efficiency by Weber,[4] to increase our diagnostic acumen in visualizing nonobstructive tumefactive colonic lesions. Most experienced roentgenologists admit that the double contrast examination of the colon is superior in most instances to the single contrast examination.

From the University of Washington School of Medicine.

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V 14
1951

Certain deficiencies exist in the present day routine examination of the colon. In the usual routine examination with a barium sulfate enema, the fluoroscopist attempts to palpate the colon, keeping pace with the head of the mixture as it traverses the organ. Some patients, in their efforts to retain the enema, hold the abdomen tense making palpation difficult. In many instances the fluoroscopist who wishes to shorten the period of the patient's discomfort, hastens the examination in order to complete it before the barium is expelled on the table. Often the sigmoid and flexures are not visualized adequately, even though the patient is turned from side to side, because of the overlapping loops that cannot be separated. Films made before and after evacuation are usually recorded, but these do not always fill in the gaps. A diagnosis of "normal" is frequently returned, even though not all sections of the organ are studied carefully. The examiner seemingly makes few errors, since most of the patients referred for examination have no organic disease or the lesions are large and easily visualized. The few errors that he does make are important ones, since some colonic neoplasms grow from small, flat or polypoid structures to annular obstructing lesions in a few months.

Certain circumstances, such as blood in the stool or a lesion seen at proctoscopic examination, require additional roentgenologic study. To do this, the patient is returned to the fluoroscopic table and a second enema tube inserted, air injected and double contrast films made. The double handling of the patient, coupled with the high percentage of poor results caused by loss of too much barium when the patient expels the enema, or dehydration of the barium left in the colon from waiting too long in the toilet before returning to the examining room, has discouraged routine use of this method. It is our purpose to present a method which copes with the above difficulties, and improves the routine examination by making possible a double contrast method of examination in a single operation. The method incorporates a system of drainage controlled by a special valve. Although drainage done during the examination is not new, the inconvenience of its application prevented workers from exploiting the method. The method described here is the result of 2½ years of trial, during which time over 3,000 colons were examined.

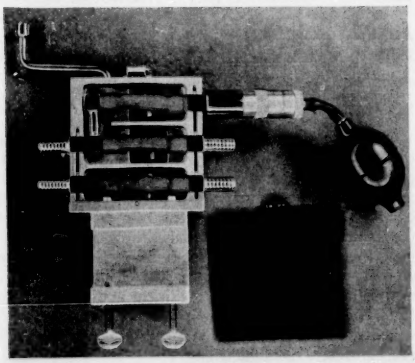

Fig. 1.—The special valve with the front cover removed. The two nipples at the left lead to the enema adaptors. At the right, the nipple below the air channel connects to the source of the enema. The lowest nipple connects to one of two openings of a catch bottle. The second opening of the catch bottle leads to a source of negative pressure (Wangensteen-Phelan). See text for details.

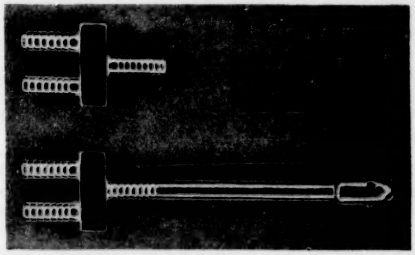

Fig. 2.—Enema adaptors: *A*, special "T" for use with self-retaining catheters; *B*, special enema tube.

APPARATUS

The equipment consists of four essential parts: a source of barium mixture, a catch bottle to which is attached a source of negative suction, special enema tubes and a special valve to control the inflow and outflow of the enema and the injection of air.

The valve consists of three parallel channels, one above the other, each composed of rubber tubing fitted at each end with a metal nipple (fig. 1). The valve is attached to the foot of the fluoroscopic table. The bottom channel is for drainage, the middle channel for the inflow of the enema and the top channel for air. The channels for air and the flow of the enema are connected on the inflow side of the valves. The valve operating the mechanism consists of three arms—one for each channel. Each arm operates a "dog" that pinches the rubber tube and closes the channel. In the first position of the arms, the enema channel is open and the air and drainage channels are closed: in the middle position, the drainage and enema channels are closed and the air channel open; in the third position, the drainage channel is open and the enema and air channels closed. This system of valves makes it possible for the barium mixture to run into the patient when the handle is in the first position, for the enema mixture to drain when the handle is in the last position and for air to enter when in the middle position. Each channel can be easily removed for cleaning.

The enema tips vary from the ordinary enema tube in that the butt has a cross arm, making the channel of the tube into the form of a T (fig. 2 *B*). Each arm of the T is connected to the patient's side of the valve. One arm conducts the enema to the patient and the other conducts it away. Two pieces of long tubing are used for the connections in order to prevent contamination by backflow and to prevent forcing of barium mixture left in the tube back into the rectum when air is injected. A small T for the attachment of the Bardex Bag (self-retaining catheter) is sometimes substituted (fig. 2 *A*). This bag is used when the patient cannot retain the enema with the ordinary tube. Only the T tubes and the two long connecting hoses are changed between patients.

ADVANTAGES

This method of examination has proved to have the following advantages: In examination of the recto-sigmoid region, particularly the redundant tortuous type, in which overlapping loops cannot be separated, immediate institution of drainage before the entire colon fills causes the colon to collapse and shorten. Loops

obscured by other loops come into view. The examination is aided by a relaxation of the abdominal wall, which the patient may be holding tense. Palpation is thus facilitated. Films are quickly made with the "spot" apparatus, a small amount of air may be injected and double contrast views made with the spot machine before the cecum and ileum fill to obscure the region. After this part of the examination is completed, much of the air is drained away and the rest of the colon examined by reinstituting the barium enema.

Should a disturbing pattern be encounteerd higher in the colon, institution of drainage stops the enema and allows the patient to relax, so that more efficient palpation can be carried out. Spot films, emphasized by Swenson,[5] are freely used.

On examination of the cecum, particularly the cecum that lies low in the pelvis and is obscured by the sigmoid and rectum, drainage causes the latter structures to collapse, bringing the cecum into view. Again, relaxation of the patient's abdomen aids in palpating the cecum and terminal ileum if it fills. Contraction of a filled appendix has been observed in this stage of the examination. Mass evacuation contractions of the colon can be followed. The discomfort they may cause a patient can be relieved by institution of drainage.

After the examination of the filled and partially drained colon is completed, air is injected under fluoroscopic control. It is surprising how frequently satisfactory double contrast films are obtained with large amounts of barium. Fischer [3] was aware of this when he introduced the double contrast method. He injected air without having the patient evacuate the barium enema.

Since not all of the colon is on the same level when the patient is prone or supine, films, either stereoscopic or not, are made with the patient prone and supine. Barium in the valleys in one view is replaced by air in the other. By comparing the two views, a good composite double contrast view of most of the colon, particularly the rectosigmoid region, is obtained.

After the examination is completed, the drainage is reinstituted to make the patient more comfortable. He is then sent to stool. When he returns, a satisfactory film of the evacuated colon, so important for inflammatory lesions, is obtained. The method has proved extremely valuable for stretcher-ridden hospital patients, who must rely on the bedpan.

DISADVANTAGES

The chief disadvantage is plugging of the drainage system from fecal material in the incompletely cleansed colon. Usually the system can be cleared by blowing in a small amount of air, since the stoppage occurs at the enema tip, where the holes are smaller than in the remainder of the tube. Even when the colon has been cleansed with castor oil, fecal masses are frequent in the cecum and ascending colon. To cope with this, some method of cleansing the colon other than with castor oil or cleansing enemas must be devised. For this reason, small lesions of the cecum and ascending colon are easily overlooked and give the chief trouble. Fortunately, in the colon prepared with castor oil, the distal portion—the site of the majority of neoplasms—is usually free of debris. It has been our experience that in the colon cleansed with enemas after castor oil, the fecal material of the cecal area is caused to flow into the most distal portions. This is also apt to occur in the patient who is sent to stool before injection of air for the double contrast film. It occurs even with the method described during drainage, but the frequency is lower.

By examination of the sigmoid region with use of drainage and close cooperation with the endoscopist, the frequency of error has been reduced. The small polyps, those less than 1 cm., usually escape detection at roentgenologic examination. As far as we can determine, it is rare that these lesions are malignant. The few small flat carcinomas that have been encountered in this region caused some deformity of the lumen before metastasis occurred. It is important to point out that reexamination, sometimes more than once, is essential if one is to be confident of the findings.

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SUMMARY

A method of examining the colon, combining the filling of the colon with barium enema, drainage and the routine injection of air for the "double-contrast" examination, is described.

This method has reduced the error in detecting neoplasms of the colon by facilitating palpation and by giving a higher percentage of satisfactory double contrast examinations.

V 14
1951

PATHOGENESIS AND TREATMENT OF THE POSTIRRADIATION SYNDROME

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The injuries from total body exposures to ionizing irradiation are multiple in nature and different in kind, and thus the spectrum of effective treatment is broad and difficult to achieve. While burns, penetrating and open wounds and fractures constitute the majority of the immediate casualties of atomic disaster, their treatment is conditioned by the fact that the systemic pattern of events which appears during the ensuing six weeks may be more serious than the initial local trauma. These latent sequelae constitute the postirradiation syndrome, which is characterized primarily by hemorrhage, infection, anemia and malnutrition.

Since the experimental approach must be employed, the dog was chosen as the animal of study, as nearly all the signs exhibited by the victims of Hiroshima and Nagasaki can be observed in the roentgen-irradiated dog. The $L.D._{.100}$ for the dog ranges between 300 and

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325 r under the experimental conditions employed by this laboratory and is fairly close to that anticipated for man. A standard exposure of 450 r was arbitrarily chosen, because this is sufficiently above the $L.D._{100}$ that should any animal survive a given therapeutic program the factor of chance alone accounting for survival would be negligible. The soundness of this assumption is attested by the fact that over a five year period no untreated animal has survived this exposure in our laboratory.

TABLE 1.—*Frequency of Gross Hemorrhage at Various Sites in Roentgen-Irradiated Dogs (450 r)*

Location of Hemorrhage	Percentage Occurrence: 14 Aureomycin-Treated Dogs	14 Control Dogs
Skin *	21	23
Gingiva	14	8
Pharynx, tonsils	43	31
Neck (subcutaneous)	14	0
Cervical lymph nodes	21	15
Thyroid glands	0	0
Chest		
Parietal pleura	50	31
Mediastinum	57	39
Lungs		
Hilar hemorrhage	29	15
Pneumonia	57	61
Heart		
Pericardium	21	46
Epicardium	79	69
Myocardium	14	0
Endocardium	14	0
Diaphragm	0	8
Abdomen		
Retroperitoneal	7	0
Stomach	64	77
Intestine	43	61
Colon	79	54
Gallbladder	0	8
Pancreas	0	8
Spleen (pedicle)	14	0
Kidneys	36	15
Ureters	7	0
Bladder	29	39
Adrenals	7	0
Mesentery	29	0
Omentum	0	0
Mesenteric nodes	43	39
Genitalia	21	0

* Skin other than in the vicinity of venepunctures.

HEMORRHAGE

Bleeding occurs in almost all animals, although its severity and importance in the cause of death vary considerably. While the most obvious gross finding at autopsy, it is probably not the most frequent cause of death. Table 1 lists the order of frequency with which hemorrhage was observed in the various organs studied.

The pathogenesis of postirradiation hemorrhage is not singular in origin, as it involves many if not all of the elements of hemostasis.

Thrombocytopenia.—Invariably thrombocytopenia is present, and if survival of eight to 12 days occurs thrombocytopenia is invariably severe (generally less than 50,000 cells per cubic millimeter [chart 1]). Thus far, no therapeutic substitute for thrombocytes (platelets) has been developed, and this very important hemostatic deficiency cannot be restored even by multiple and frequent blood transfusions.

Although not all observers have noted an increase in the clotting time following such exposures,[1] our experience leads us to believe that increases in the clotting time do occur with the high degree of frequency others before us have reported, especially when careful technic has been followed.[2] Of the 79 control animals forming the basis of this report, 75 demonstrated an increased clotting time on one or more occasions during the postirradiation period. This increase, however, does not necessarily persist throughout the entire period. It is most marked between the eighth and tenth days and often returns to normal terminally.

Prothrombin.—Prothrombin activity generally is not significantly altered after irradiation, despite certain profound hemostatic changes, including thrombocytopenia.[3] Aside from the platelets, the accelerators of prothrombin do not appear seriously disturbed. The precautionary administration of vitamin K may be advisable, although our data do not support this contention.

A Circulating Anticoagulant.—The cause of this increased clotting time is not nearly so obvious as the demonstration that coagulation is prolonged. Thrombocytopenia may in part be responsible for this increased clotting time, although from the regularity with which thrombocytopenia is present in all our animals, the clotting time should be expected to be increased when severe thrombocyte deficiency develops. This has not been found to occur.

In some animals, the presence of a circulating anticoagulant can be demonstrated. In others, no evidence for an inhibitor can be found, even though coagulation may be greatly delayed.[4] When present, its physiological action in some, but not all, respects resembles that of heparin, but certainly this similarity is not sufficient to warrant the conclusion that the inhibitor is heparin of the commercial type.[5] Possibly other nonheparinoid inhibitors also are present but thus far, none has been described.

In some animals, hemorrhage responds partially, and less often completely, to the administration of toluidine blue and, to a smaller extent, to protamine sulfate. These agents are known to form salts with heparin and with a number of anticoagulants similar to but less potent than heparin. In man, toluidine blue is best administered slowly intravenously in daily doses of 5 to

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5. Allen, J. G.; Grossman, B. J.; Elghammer, R. M.; Moulder, P. V.; McKeen, C. L.; Jacobson, L. O.; Pierce, M.; Smith, T. R., and Crosbie, J. M.: Abnormal Bleeding: Response to Treatment with Toluidine Blue and Protamine Sulfate, J. A. M. A. **139**: 1251 (April 30) 1949. Allen, J. G.; Grossman, B. J.; Elghammer, R. M.; Moulder, P. V.; McKeen, C. L.; Sanderson, M.; Egner, W., and Crosbie, J. M.: Abnormal Bleeding: II. Further Clinical Experience with Toluidine Blue and Protamine Sulfate, Surg., Gynec. & Obst. **89**: 692, 1949. Allen, J. G.; Moulder, P. V.; McKeen, C. L.; Egner, W.; Elghammer, R. M., and Grossman, B. J.: Independence of Protamine Titration and Platelet Level in Certain Hemorrhagic Diseases, Proc. Soc. Exper. Biol. & Med. **70**: 644, 1949.

7 mg. per kilogram of body weight during the bleeding period.[4] Protamine, although more rapid in action, is much less effective, for reasons not entirely understood. Its duration of action is less than two hours, while that of toluidine blue is 24 to 36 hours. The results of the administration of these agents in irradiation hemorrhage

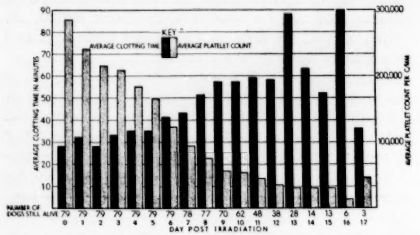

Chart 1.—Average whole blood clotting times and platelet counts of 79 dogs after single body exposures to roentgen rays (450 r).

or other similar hemorrhagic states [5] are unpredictable, because these hemostatic disturbances, as well as those of irradiation hemorrhage, are generally multiple, and these agents affect only one aspect of these hemostatic disturbances. Therefore, this type of therapy is incomplete. In some instances when only this heparinoid defect is present, the response of bleeding after toluidine blue administration has been dramatic when all other measures have failed.[6]

Protein Denaturation.—There is evidence to suggest that some of the plasma proteins are altered by irradiation, by such mechanisms as aggregation or hydration of proteins or their abnormal synthesis after exposure.[7] Since the clotting elements of plasma are largely protein in nature, these too may be affected, thereby altering their reactivity and accounting in part for the increased clotting time observed after roentgen irradiation. Thus far, no therapeutic approach for this phenomenon is evident.

Capillary Hemorrhage.—That the normal integrity of the capillaries is disturbed in any spontaneous hemorrhagic state seems the correct explanation for capillary hemorrhage. Blood may escape from these small vessels as a result of direct injury, or because diapedesis proceeds to hemorrhagic proportion, or because the hypothetical continuous function of the normal clotting mechanism, which contributes something essential to the normal physiology of the "capillary wall," is not sufficiently active during the postirradiation syndrome to prevent spontaneous hemorrhage. Rutin and related substances, including ascorbic acid (vitamin C), have been advocated as effective agents in combating capillary disease in general as well as that induced by roentgen-irradiation.[8] Since there is no completely effective antihemorrhagic program for irradiation hemorrhage, such agents should be considered in the antihemorrhagic program.

Blood transfusion is without evident effect on bleeding.[9] In some of our animals, both hemorrhage and the clotting time appeared to be increased immediately after transfusion (chart 2). Since the occasions in which these most frequently occurred were associated with mild transfusion reactions, the true nature of this phenomenon remains unsatisfactorily explained. It is well established, however, that frequent transfusion of freshly drawn blood will exert no effect on either the platelet or leukocyte counts of the recipient.

INFECTION

After lethal exposures to total body-ionizing irradiation, infection frequently occurs and accounts for a large portion of deaths that occur. At Hiroshima and Nagasaki,[10] infection and hemorrhage were said to account for many of the fatalities occurring between the second and the sixth week.

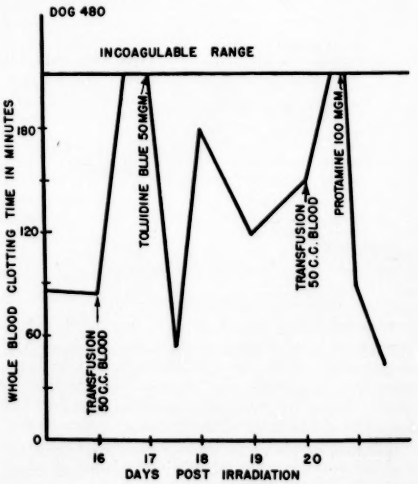

Chart 2.—Increased whole blood clotting time immediately after transfusion of blood attended by transfusion reactions during postirradiation period.

Lethal or near lethal exposures may reduce temporarily the effectiveness of the immune mechanisms, both innate and acquired, until the organism's protective measures are too exhausted to cope with infection.[11] These conditions impose a trying problem on the surgeon so far as débridement and treatment of wounds and burns are concerned, because at the height of normally expected healing the person becomes prey for both

6. Footnotes 4 and 5.

7. Galluzzi, N. J.; Enerson, D. M.; Glotzer, D. J.; Moulder, P. V., and Allen, J. G.: Abnormal Bleeding: XIII. Physical Phenomena in Blood Coagulation, Argonne National Laboratory Report, ANL 4474, 1950. Bottazzi, F.: The Surface Tension of Colloids with Special Reference to Protein Colloids, in Alexander, J.: Colloid Chemistry: Biology and Medicine, New York, Chemical Catalog Company, Inc., vol. 2, 1928.

8. Rekers, P. E., and Field, J. B.: Control of Hemorrhagic Syndrome and Reduction of X-Irradiation Mortality with a Flavone, Science **107**: 16, 1948. Shanno, R. L.: Rutin: A New Drug for the Treatment of Increased Capillary Fragility, Am. J. M. Sc. **211**: 539, 1946.

9. Enerson, D. M.; Moulder, P. V., and Allen, J. G.: To be published.

10. Warren, S., and Draeger, R. H.: Pattern of Injuries Produced by Atomic Bombs at Hiroshima and Nagasaki, U. S. Nav. Bull. **46**: 1349, 1946.

11. (*a*) Hektoen, L.: Further Studies on the Effects of Roentgen Rays on Antibody Production, J. Infect. Dis. **22**: 28, 1918. (*b*) Taliaferro, W. H., and Taliaferro, L. G.: The Effects of X-Rays on Immunity, Metallurgical Laboratory, University of Chicago, 1946. (*c*) Fredell, H.; Sanderson, M.; Kirschon, A.; Milham, M., and Allen, J. G.: The Effects of X-Rays on Antibodies, Argonne National Laboratory, ANL 4078, 1947.

V 14
1951

infection and bleeding and no longer can eat and nourish himself. Thus wounds that are of little consequence under normal conditions assume serious proportions in the irradiated person.

When one is interpreting the harmful effects of ionizing radiations in terms of immunity, it must be

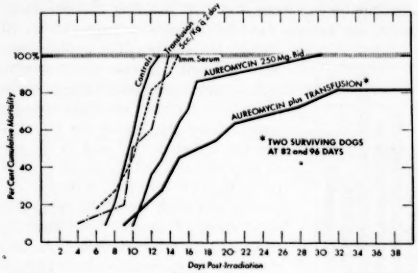

Chart 3.—Cumulative mortality of dogs subjected to roentgen rays (450 r).

remembered that the immunity of the host and the virulence of the invading mechanism are measured largely in terms of each other. In the case of irradiation injury, infection is probably due not to any increase in the virulence of the organism but to the increased susceptibility of the host to invasion and to the inability of the animal to isolate and destroy organisms once these enter the circulation.[11b] The ease with which organisms may gain portals of entry is due not only to the lacerations, abrasions or burns incident to an atomic explosion but also to the desquamation, ulceration and/or punctate hemorrhages which develop in varying degrees in most animals in the late stages of intense irradiation. This is especially true of the oral cavity and the gastrointestinal tract and less frequently true of the respiratory system.

Leukopenia.—Of equal or greater significance than the ease with which invasion occurs is the fact that once such organisms enter the blood stream, they are relatively unopposed by the circulating forces of immunity, since the leukocytes are nearly absent and the antibody titers markedly reduced.

It is important to realize that the peripheral blood picture in the postirradiation syndrome reflects the activity of the noncirculating parent blood elements. Indeed, there is reason to suspect that the number of circulating leukocytes is probably less important than the circulating antibodies, which also are associated with the formed elements of the blood and their cellular progenitors, the reticuloendothelial system. Animals given less severe exposures than 325 r still show the same severe leukopenia and thrombocytopenia, but the antibody titers are less severely affected. In such animals, infection is not so serious a problem, and survival even without treatment is possible.[12] No therapeutic agent yet devised has proved successful in preventing or treating leukopenia induced by ionizing irradiation.

Antibodies.—A study of the effect of passive transfer of antibodies was conducted, using 10 cc. of antidistemper serum, 1 cc. (1,000 units) of tetanus antitoxin and 1 cc. of gas gangrene antiserum containing 1,000 units of Clostridium perfringens (welchii) antiserum. This mixture was injected intravenously daily into 11 dogs. The results are plotted in chart 3 and are expressed as cumulative mortality. The curve obtained is not different from that of the untreated control group. Several years ago, a similar experiment in which larger doses of immune serums were used was performed on eight dogs, whose mean survival rate was increased three days.

Passive transfer of antibody was also attempted, with use of 5 cc. of freshly drawn citrated normal whole blood per kilogram of body weight. This was administered to 10 animals approximately every other day, beginning on the third postirradiation day. The cumulative survival percentages of this group were remarkably similar to both those of the irradiated untreated series and those irradiated and receiving serum (chart 3). The average survival time was 10.8 days for the transfused group, whereas that for any series of controls (15 dogs or more) has been 11 to 12 days.

Antibiotics.—Aureomycin hydrochloride was administered to 14 irradiated animals, beginning the day following the 450 r exposure. This was given orally twice daily in doses of 250 mg. each and intravenously, 100 mg. twice daily, when the animal failed to eat. Several changes were noted that departed from the previous experience with untreated or otherwise treated animals. Weight loss, which in the control group was maximum on the twelfth day, occurred later in the treated animals (chart 4). Hemocytological studies disclosed a slight delay in the onset of severe leukopenia and of severe anemia in the aureomycin-treated animals, but no significant change in the onset of thrombocytopenia was evident (chart 5). In general, the onset of serious clinical illness also was delayed about six days, during which the animal continued to eat.

Bacteriologic cultures from bloods of the untreated and aureomycin-treated animals were made at intervals before and after exposure [13] (table 2). At 450 r, no significant differences between the irradiated untreated controls and the irradiated aureomycin-treated animals were noted, whereas at 300 r there were definite differences. The organisms obtained were variable, and frequently different organisms were obtained from the same animals on different occasions. Dr. Miller and Miss Hammond emphasized the preliminary nature of their observations, and further studies of this nature are planned.

TABLE 2.—*Results of Blood Cultures on Roentgen-Irradiated Dogs*

Dose	Drug Therapy	Number of Dogs	Number of Cultures	Per Cent Positive Cultures
300 r	Untreated	4	31	26
300 r	Aureomycin	6	37	7
450 r	Untreated	15	38	16
450 r	Aureomycin	15	50	14

The cumulative survival percentages were definitely shifted to the right (chart 3), the average survival time

12. Prosser, C. L.: Plutonium Project Report 22B.
13. Dr. C. Phillip Miller and Miss Caroline Hammond, of the Department of Medicine, University of Chicago, made the bacteriologic cultures.

being increased from 11 days for the control group to 17 days for the aureomycin-treated animals. There were, however, no survivors in this group.

Aureomycin Combined with Blood Transfusions.—Another series of 11 dogs was irradiated with roentgen rays (450 r) and given the same regimen of aureomycin. In addition, each of these animals received 5 cc. of blood per kilogram of body weight every second day, beginning with the third postirradiation day. From chart 3 it is evident that, whereas transfusion alone was without effect on cumulative mortality percentage, transfusion therapy combined with aureomycin was more beneficial than administration of aureomycin alone. Moreover, two of the 11 animals so treated are surviving at 82 and 96 days, respectively. Both animals appear to have recovered from the acute stages of irradiation injury. The postirradiation course of one of these, dog 462, is presented in chart 6. The importance of these data is apparent from the fact that over a five year period, we have had no dogs survive 450 r with any other type of treatment. These data suggest that other substances, which when given alone have little effect on survival, may be more useful when combined with antibiotics and blood. Experiments of this nature are in progress.

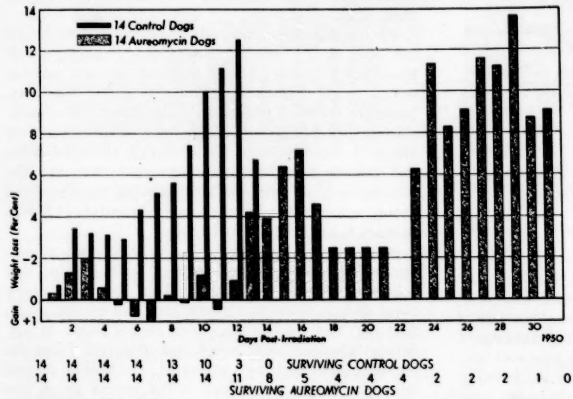
14 Control Dogs
14 Aureomycin Dogs
Gain Weight Loss (Per Cent)
Days Post-Irradiation
1950
14 14 14 14 13 10 3 0 SURVIVING CONTROL DOGS
14 14 14 14 14 14 11 8 5 4 4 4 2 2 2 1 0
SURVIVING AUREOMYCIN DOGS

Chart 4.—Percentage of weight changes in dogs exposed to roentgen rays (450 r).

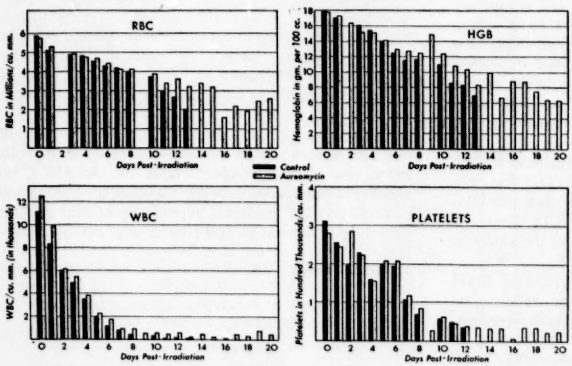

Chart 5.—Average blood cell counts after exposure to roentgen rays (450 r).

ANEMIA

Pathogenesis.—An acute and profound anemia always develops in the irradiated dog receiving 450 roentgens when the animal survives sufficiently long (10 to 14 days). Several possible explanations may account for this phenomenon, but no one factor alone seems sufficient to explain all the changes noted. Since the life of the circulating red blood cell is said to be two to four months and the acute anemia of irradiation develops between the second and third week, the rapid disappearance of the red cells must be explained on other premises. Among those to be considered are hemorrhage, either internal or external; actual cell destruction, either by hemolysis and/or by phagocytosis, and acute changes in blood volume.

There can be no doubt that hemorrhage takes its toll. However, since the extent of bleeding varies widely from one animal to another, whereas the development of anemia is fairly uniform in severity, it seems likely that other factors also contribute. Agglutination and a profoundly increased sedimentation rate suggest the possibility of the trapping of red cells within widely scattered areas of the capillary bed, but microscopically there is no evidence to suggest this mechanism. Also possible is an increased rate of phagocytosis, but this has not yet been studied in the dog. Hemolysis would seem by exclusion to be the most likely explanation for that portion of anemia not seemingly accountable to hemorrhage, but greater increases in pigment excretion of stool and urine than have been reported appear necessary to explain the extent of the anemia observed.

A number of investigators, including those in our own laboratory, have noted a decrease in blood volume in the dog after exposures of 250 to 450 r. The changes observed would tend to compensate for the anemia; even so, the anemia may still be pronounced. However, the methods used (dye technic, tagged proteins or red blood cells) are not beyond question when applied to the acute postirradiation syndrome, in which there is good reason to suspect an increased plasma loss to the extravascular spaces and in which hemorrhage is commonly observed. Thus it would seem unwise to conclude

V 14
1951

that the blood volume values actually obtained represent an accurate index of the changes that do occur in blood volume.

The extent to which the anemia develops is further evident from the quantity of daily blood replacement required to sustain the blood count and hemoglobin concentrations at near normal levels. It was found that, within the limits of variations noted, 8 to 10 cc. daily per kilogram of body weight was necessary if the transfusions were commenced after the first week following exposure. Daily volumes of 12 to 15 cc. per kilogram resulted in plethora.

Treatment.—It is probably not necessary to correct or prevent completely the anemia of the postirradiation syndrome. Erythrocyte counts above 4,000,000 were considered an adequate compromise in most of our animals, and this, with few exceptions, has been accomplished with transfusions of 5 cc. per kilogram given every second day beginning with the second day after exposure. These figures do not include additional blood given to replace that drawn daily for laboratory study. If these data can appropriately be applied to the 70 Kg. man receiving similar biologic exposure, the following values are obtained:

1. To sustain normal red blood cell counts and hemoglobin concentrations, 500 to 700 cc. is required daily, beginning the first week after exposure.

2. To sustain the erythrocyte count above 3,000,000, administration of 350 cc. would be required every second day, beginning the third day after exposure.

3. Plethoric levels would result if 850 to 1,000 cc. a day was given for more than a week unless hemorrhage was extensive.

A secondary or latent anemia also develops. This generally is most evident between the fourth and sixth weeks and is probably the result of marrow aplasia or hypoplasia. Some evidence of anemia often is still evident two to three months after exposures of the few dogs which survive 300 r. Of interest in this connection is the secondary depression in the red blood cell count and hemoglobin concentration that occurred in dog 462 between the fifty-seventh and sixty-fifth day (chart 6). This occurred during the period in which the animal had an unexplained febrile episode. With blood transfusion and as the fever subsided, the red blood cell count returned to normal. Blood transfusion, as indicated by peripheral blood studies, is the most effective therapeutic agent available for correction of anemia, although its effectiveness may be implemented by the administration of a diet high in protein content, and supplemented by iron, liver and possibly folic acid and vitamin B_{12}. To be emphasized is the fact that the marrow activity will recover, provided the irradiated person can be carried through the period when infection and hemorrhage are serious hazards.

In the acute phase of anemia, oxygen therapy should be considered, for, in addition to air hunger incident to anemia, there is some evidence that other factors relating to oxygen need and transport are also concerned. If oxygen therapy is not practical, early evacuation of patients from high altitude areas to near sea level should be seriously considered.

NUTRITION

Need for Parenteral Therapy.—Except for the first day, most animals eat well for one to two weeks after exposure. Thereafter, diarrhea, anorexia and vomiting occur to an unpredictable degree and are associated with ulcerations and edema of the gastrointestinal tract. Premortally, nearly all food is rejected, although water is generally consumed until just before death. Thus, where heretofore we have been able to rely on high caloric and high protein feedings to support patients whose burns were uncomplicated by irradiation, this same program is doomed to failure in the irradiated and burned patient. Parenteral feeding is a necessity and needs to be employed extensively when the patient can no longer eat. During the period of anorexia and even later, the weight of the animal gradualy declines, although when aureomycin is given, this change is delayed (chart 4).

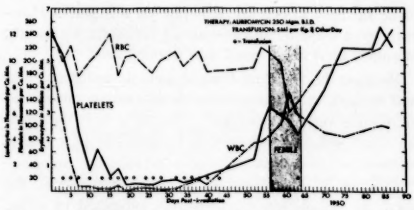

Chart 6.—Postirradiation course of dog 462.

Undoubtedly a large portion of the weight loss can be accounted for on the basis of diminished food consumption. Other factors also contribute, for, in general, nitrogen excretion is increased in the urine and occasionally in the feces. Variations between different animals and even in the same animal on successive days are often pronounced. Contributing to this increased nitrogen excretion is the febrile course all animals displayed during the latter portion of the postirradiation period.

Serum protein concentrations generally decline during the midportion of the postirradiation syndrome, primarily because of a decrease in serum albumin. Most animals show a premortal rise in protein concentration which often exceeds the control values.

Correction Therapy.—When it is no longer possible for the animal to eat, parenteral nutrition is essential. This will generally be required between the tenth and thirty-fifth days. Of the parenteral agents, blood is the most important. While it is to be expected that plasma should be of value, its importance has not yet been subjected to experimentation in these animals. Dextrose, saline solution and possibly the amino acid hydrolysates will be required to meet the fluid and caloric needs and to combat diarrhea and vomiting.

Vitamin supplements also may be required to meet the general nutritional demands during the postirradiation syndrome.

COMMENT

The data presented suggest that it is already possible to increase significantly the survival rate incident to atomic disaster within ranges up to 25 and 30 per cent above the present $L.D._{100}$. There is reason to suspect that in the not too distant future even more can be accomplished. Undoubtedly there is a limit beyond which further anti-irradiation therapy will necessitate mechanical protective measures against the effects of explosion, fire and heat, as well as ionizing radiations. It is the responsibility of the physician ultimately to improve his therapeutic regimen to the extent that those receiving exposures above the present day $L.D._{100}$ and surviving the immediate explosion can be carried through the critical six week period that immediately follows. It is probable that if the $L.D._{100}$ (untreated) can be extended 50 to 100 per cent, these practical measures will be largely fulfilled. To accomplish this, better control of infection and hemorrhage would appear of prime importance.[14] While some progress has been made in these directions, it is not yet adequate. However, even these measures will not substitute for careful attention to clinical detail and nursing care.

Because the bacterial flora in animals and man differ and because the susceptibility of different organisms to antibiotics varies, antibiotics covering a wide bacterial spectrum will be necessary to achieve the best results in man.

In time of widespread catastrophe in the past, the surviving population was generally subjected to active immunization to the more prevalent contagious diseases. Available experimental evidence [14a] has demonstrated the impaired capacity for antibody synthesis in the irradiated animal. Passive antibody transfer would seem, therefore, a valuable if not indispensable adjunct, as the active immunization procedures will probably be less efficient in the irradiated patient.

Certain measures when employed just before exposure are known to influence survival. Partial shielding, especially, seems effective in this direction. Cysteine and the estrogens have some effect when given before exposure but do not influence survival when administration is begun after exposure. Whether some of these agents might exert an effect during the postirradiation period when antibiotics and frequent transfusions also are given remains to be seen.

Hemorrhage remains a serious problem. It cannot yet be assumed that any one therapeutic approach will obviate this distressing complication, because of the protean nature of its pathogenesis. Thrombocytopenia, capillary injury, infection and possibly denaturation of proteins are important contributors to this hemorrhagic pattern. In addition, there is in some animals the physiological disturbance in coagulation that in certain limited respects resembles that produced by a weak heparin solution. The observations of Sylven [15] and Campani [16] concerning the postirradiation changes occurring in the mast cells, which are thought to be the origin of endogenous heparin, may be related to the pathogenesis of irradiation hemorrhage. Both authors described a partial disintegration of these cells after irradiation, with release of their granular contents into the surrounding tissue. The precise relationship of the release of these granules to the physiological alterations in coagulation following irradiation has yet to be demonstrated. Although biologic anticoagulant activity has been demonstrated in some of our irradiated animals, we have been unable to isolate heparin from their blood.[17]

The treatment of local injuries, however trivial, is exceedingly important, because the generalized systemic disorders of body economy magnify the hazards of local injury. This is especially well illustrated by the period in chart 6 during which there was a febrile response in the animal, presumably from some intercurrent infection. This febrile reaction not only produced a serious drop in the red blood cell count but also depressed the platelet count. It is therefore evident that infection, hemorrhage, anemia and malnutrition must be kept under control if the treatment of local injuries is to succeed.

SUMMARY

1. The postirradiation syndrome is characterized by infection, hemorrhage, anemia and malnutrition.

2. Progress has been made in the treatment of these important disorders, and there is reason to anticipate even better results when several rational therapeutic programs are combined.

3. Anemia can be controlled by blood transfusion, but this does not increase the platelet or leukocyte counts. Transfusion alone did not increase the survival period in our dogs irradiated with 450 r, although it may appear more beneficial in less serious exposures. Transfusion every second day plus daily doses of aureomycin, however, did increase the survival time, and two of 11 animals so treated have survived the critical period of six weeks.

4. The general nutritive status of the person can be cared for orally for one to two weeks after exposure, but thereafter parenteral feeding may be necessary for several weeks. Frequent transfusions of blood and probably plasma are perhaps the best means to achieve this end. This is a new and serious problem which is largely foreign to previous experiences in burn therapy of nonirradiated persons, for whom extensive oral feedings are generally possible.

14. (*a*) Miller, C. P.; Hammond, C. W., and Tompkins, M.: The Incidence of Bacteremia in Mice Subjected to Total Body X-Irradiation, to be published. (*b*) Howland, J. W.; Furth, F.; Bennett, T. R.; Coulter, M., and McDonnel, G. M.: Studies on Factors Effecting the Radiation Syndrome: I. The Effect of Aureomycin and Antibiotics on Whole Body Irradiation, Atomic Energy Project Report, University of Rochester, 1949.

15. Sylven, B.: Studies on the Liberation of Sulphuric Acids from the Granules of the Mast Cells in the Subcutaneous Connective Tissue After Exposure to Roentgen and Gamma Rays, Acta radiol. **31**: 206, 1940.

16. Campani, M.: Effetto della irradiazione con alte dosi di raggi roentgen sulle cellule granulose basofile connettivali (Mastzellen), Boll. Soc. med.-chir. Modena **48**: 3, 1948.

17. Sutherland, J. M., and Allen, J. G.: Abnormal Bleeding: XIV. Further Studies on the Isolation of Heparin from Blood of Irradiated Dogs, Argonne National Laboratory Report, ANL 4474, 1950.

V 14
1951

5. Irradiation injury is a systemic disease. Wounds, burns and other injuries must be considered in the light of the entire body economy, for the careful management of local wounds is of little consequence if the subsequent general physiological disorders are not taken into account.

ABSTRACT OF DISCUSSION

DR. STAFFORD L. WARREN, San Francisco: This is an exceedingly important subject. Obviously this Section on Military Medicine is keeping in mind the possibility of an atomic war. The radiation injury is very extensive, and the problems that it presents are very great, although it may be masked to some extent by the overlying injuries by blast and fire burns. I cannot forget the appearance of the temporary shelters at Nagasaki and Hiroshima between the fourth and the sixth week. The floors of the shelters were covered by thousands of persons who had what might be called hemopoietic syndrome, with purpura, reduced hemoglobin and red blood cell count, a marked leukopenia, few or no platelets, failure of the clotting mechanism, bleeding from the various orifices, bleeding ulcerations which occurred in the throat and on the gums, and, on the whole, the same sort of aplastic marrow and terminal systemic situation that Dr. Allen has produced in his dogs. In the dog, the small intestine and the bone marrow and other hemopoietic tissues are very sensitive. In the doses of radiation used by Dr. Allen, the dog is able to survive the intestinal injury but not that to the hemopoietic structures. Old experiments show that protection of even one vertebral body is sufficient to make the difference between death and survival; hence some additional assistance is needed to carry the body along until the injured marrow and other tissues can carry on the circulation. Dr. Allen's proposals concern just that. However, the problem is not solved, for the recovery of the marrow is hyperplastic in character, and in some dogs, the marrow is full of abnormal cells and anemia exists for a long time, with the animal in a precarious state in the face of any physiological stress. Dr. Allen's work is an important step. With a better understanding of the lesions produced by radiation, it may be possible to provide better treatment or, perhaps, even some protection to the hemopoietic structures, for today we have little to offer to the large masses of casualties which may be the result of atomic warfare.

COMMANDER EUGENE P. CRONKITE, Bethesda, Md.: One practical phase of the problem that Dr. Allen did not cover because of lack of time is the allocation of available supplies of blood and antibiotics. After an atomic bomb explosion there will be thousands of casualties presenting traumatic, thermal and radiation injuries singly or in combination. The demand for blood and antibiotics may exceed the supply; hence a priority system for the use of these agents may be necessary—for example, giving the fatally irradiated the lowest priority, those with traumatic and thermal injuries the highest priority and those with pure radiation injury or radiation injury complicated by other injury an intermediate priority. Such a system will insure the use of these valuable therapeutic agents to the best interests of the public. Dr. Allen dwelt at length on the clotting defect. At the Naval Medical Research Institute we have studied this extensively. If a clotting defect is due to heparin, toluidine blue and protamine would certainly be of therapeutic value. The appearance of an anticoagulant has been infrequent in our experience. We are inclined toward believing the clotting defect is primarily caused by a profound thrombocytopenia resulting in very slow prothrombin utilization (Buckwalter, J. A.; Blythe, W. B., and Brinkhous, K. M.: Am. J. Physiol. **159**:316-321, 1949). The use of rutin and flavonones as therapy has been considered by others. The value of these is questionable. The anemia is due to cessation or diminution of blood production, hemorrhage and increased destruction. Cessation of production alone would result in a deficit of about 1 per cent a day or roughly indicate a need of about 70 ml. a day of whole blood for uncomplicated radiation injury. Miller and Allen at the University of Chicago and Howland and his associates at the University of Rochester have been reporting encouraging results from the use of antibiotics in radiation injury. Malignant granulopenia and aplastic anemia are maintained, and survival is greatly increased by the judicious use of blood and antibiotics. It can be logically anticipated that the survival rate of casualties with a temporarily radiation-induced pancytopenia will similarly be increased by the same therapeutic regimen.

COLONEL ELBERT DE COURSEY, Washington, D. C.: A number of the wounded were brought from the Nagasaki disaster to the Omura Hospital, about 15 miles (24 kilometers) away. In that group of patients, around 30 to 40 per cent were estimated to be radiation casualties. As Dr. Warren has said, the important lesion from ionizing radiation was in the reticuloendothelial system, in which the specific blasts and their blood cell descendents are sensitive, but fortunately the primitive reticuloendothelial cells are radioresistant. The accompanying tabulation shows all the records I could find of white blood cell counts of the first two weeks after the atomic bomb explosion in Hiroshima and Nagasaki:

White Blood Cell Counts After Atomic Bomb Explosion

Time After Explosion	Number of Patients Tested	White Blood Cell Counts
Second day	2	1,670-2,200
Third day	8	200-1,000 *
Sixth day	2	400-1,400
Seventh day	17	150- 920 †
Second week	13	25- 740 ‡

* On another occasion 1,600.
† On three occasions above 1,000.
‡ On another occasion 1,700.

As far as I know, this represents the total knowledge of leukocytic reactions in humans from atomic bomb detonations. This tabulation shows that we need to keep blood cell count records of the first few hours and days if such casualties ever occur again. All the progeny of this histiocytic system similarly are depressed in varying degrees. This lesion emerges as the fundamental radiation problem. Therefore, treatment must be planned primarily to prevent the reticuloendothelial loss, to overcome it by adequate replacements or substitutions or to overcome all the harmful effects of the loss, including infections, hemorrhages and altered metabolism. Practical prevention or increase of resistance appears to be possible, preirradiation prophylaxis with an antioxidizing agent having decreased significantly the mortality in irradiated animals. Antibiotic therapy has been most promising in work at the Army Medical Research and Graduate School, where oral administration of aureomycin has reduced animal mortality from 80 per cent to 20 per cent in their experiments.

Obstetrics.—The obstetrician occupies an unusual place in the practice of medicine. Most of his patients are not sick, but are performing the natural function of reproduction. If this function were always normal his cares would be few indeed, but complications and accidents may occur suddenly and with disquieting frequency. He must also be a surgeon, an internist and, on occasions, a pediatrician. His work demands the most meticulous aseptic technic, his patients may suffer from any medical ailment, and he has the first opportunity to detect disease or abnormality in the newborn infant. These are the factors that make his specialty one of the broadest and most interesting in medicine. The ideal of good obstetrics is, whenever possible, to bring every gravid woman through her pregnancy, confinement and puerperium alive and well and with a living, healthy infant. . . . According to the National Office of Vital Statistics the maternal mortality for the birth registration area in 1915, the first year for which the number of births is available, was 6.1 per 1,000 live births. In 1947, the last year with published results, the rate was 1.3. This is the lowest national rate for the United States, and it is also the lowest rate for any country, large or small.—Frederick C. Irving, M.D., Medicine as a Science: Obstetrics, *The New England Journal of Medicine*, Jan. 18, 1951.

PROPHYLACTIC AND THERAPEUTIC CONTROL OF VESTIBULAR DISTURBANCES WITH DIMENHYDRINATE

Leslie N. Gay, M.D., Baltimore

In February 1949, a preliminary report on the prevention and treatment of motion sickness with dimenhydrinate (dramamine®) was presented to the Johns Hopkins Medical Society. The study was planned and executed by Gay and Carliner [1] on the United States Army Transport *General Ballou*. This transport, which carried 1,366 soldiers to Bremerhaven, Germany, sailed from New York on Nov. 27, 1948 and arrived at its destination Dec. 8, 1948. Weather conditions were moderately rough for the first five days, with a roll of 4 to 15 degrees, and violently rough for the remaining five days, with a heavy roll of the vessel from 22 to as high as 35 degrees. The data accumulated on the voyage proved that dimenhydrinate in doses of 50 to 100 mg. every six hours is a nontoxic, prophylactic and therapeutic drug capable of controlling the symptoms of seasickness. The drug was administered to seasick soldiers, orally and rectally, and no untoward side effects were noted by the investigators, who accompanied the transport to Germany. In the group of 389 men who had moderate to violent symptoms of seasickness while en route to Bremerhaven, complete relief was obtained by all but 17. This study was carefully controlled by the use of a placebo capsule containing lactose, which was given to large groups of soldiers who participated in the experiment.

REPORT OF THE LITERATURE

The following report pertains to the relief that patients who suffer from vestibular disturbance obtain from the use of dimenhydrinate. The rapidity of recovery from seasickness after the administration of dimenhydrinate suggests that the perilymph or the endolymph in the semicircular canals plays an important role. A timely study for the determination of the extent to which the action of antihistamine drugs is referable to a direct effect on the capillaries was published by Haley and Harris [2] in March 1949. Schiff, Esmond and Himwich [3] report the correction by dimenhydrinate of forced circling movements elicited by means of anatomic lesions in numerous areas of the central nervous system. The production of compulsory turning was first observed by Freedman and Himwich,[4] who elicited this response by the intracarotid injection of diisopropyl fluorophosphate, a drug that destroys cholinesterase and permits accumulation of acetylcholine. They called this response the adversive syndrome. Atropine, scopolamine hydrobromide and diphenhydramine (benadryl®) hydrochloride also correct this abnormality. Johns and Himwich [5] have studied the central action of seven other members of the antihistamine group. They attempted to correct forced circling movements and seizure brain waves produced by the intracarotid injection of diisopropyl fluorophosphate. Diphenhydramine, dimenhydrinate and lergigan (French preparation, 10-[2-dimethylaminopropyl] phenothiazine) cured diisopropyl fluorophosphate-induced cortical seizures. The action of phenergan (French preparation, 10-[2-dimethylaminoisopropyl]-phenothiazine) was inconsistent, but phenindamine tartrate (thephorin®), antazoline hydrochloride (antistine®), tripelennamine (pyribenzamine®) hydrochloride, pyrilamine (neoantergan®) maleate and chlorprophenpyridamine maleate (chlor-trimeton®) failed to eliminate the seizure waves. The adversive syndrome produced by the injection of subconvulsive doses of diisopropyl fluorophosphate was corrected by diphenhydramine, dimenhydrinate, lergigan and phenergan. The other five antihistamines were without corrective effect. In a recent publication, Batterman [6] reported the effects of two types of vestibular stimulation after the administration of several drugs, including dimenhydrinate. Through the action of dimenhydrinate in the first type of stimulation, the onset of nystagmus was delayed and its duration was shortened. Under galvanic stimulation, more current was required for tilting after dimenhydrinate had been administered. Diphenhydramine and several sedatives had no influence on the vestibular reaction in either test.

The control of labyrinthine disturbance has been difficult. Many remedies have been tried, and many failures have been encountered in spite of variations in treatment. Campbell [7] reported his results with the use of dimenhydrinate to lessen or prevent dizziness after the labyrinth fenestration operation (tables 1 and 2). He gives a detailed account of the reaction of 28 patients on whom he operated. The average patient vomits frequently throughout the day of operation and always when aroused or disturbed in any way. The patient is unable to retain liquids, and intravenous fluids are always given after operation. On the first day after operation, the average patient has vertigo and nausea, and he often vomits two to six times. About half the patients can take a sufficient amount of water by mouth, but the others still require intravenously administered fluids. Nystagmus on the first day is usually so severe that the patient is unable to raise his head or tolerate elevation of the bed. On the second day after the operation the average patient can take liquids, but he still has vertigo and nausea and sometimes vomiting. On the third day the head of the bed may be elevated, and the

Tables 3, 4 and 5 appear in the author's reprints but are omitted in THE JOURNAL because of lack of space.

From the Allergy Clinic of the Medical Department, the Johns Hopkins University and Hospital.

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V 14
1951

patient can eat solid food. On the fourth day he can get out of bed, but for the next two or three days he is very unsteady on his feet.

Dimenhydrinate (100 mg. tablet) was administered by mouth if it could be retained; if not, it was given by rectum. The general plan was administration of 200 mg. immediately after the patient was returned to his bed from the operating room and four subsequent doses (100 mg. each at three-hour intervals), a total of 600 mg. on the day of operation. On the next day 600 mg. was administered, each dose (100 mg.) was given every three hours. No dimenhydrinate was administered on the third or on subsequent days unless vertigo became worse. This occurred in a few instances. The postoperative care of the 28 patients given dimenhydrinate was exactly the same as that given the control patients who had the same operation but no drug.

Campbell reported the following results after the administration of dimenhydrinate:

1. After operation there was only slight nausea with no vomiting.

2. In all 28 patients, the vertigo was less severe than in the control group. In the average patient not given the drug, moderate vertigo and nausea occur on the third and even the fourth day.

3. A surprising feature was the fact that only eight of the 28 patients relapsed after the drug had been discontinued. The vertigo and nausea in the few patients who had a relapse promptly subsided, often within one hour, when 100 mg. of dimenhydrinate was again given.

4. The treated patients were able to enjoy a normal diet approximately two days sooner than the untreated ones and were discharged from the hospital one or two days earlier.

5. Rectal administration was as effective as the oral method.

6. The depression and drowsiness in the treated patients were certainly no greater than in the untreated patients, and the treated group was more alert because of less vertigo and nausea.

TABLE 1.—*Effectiveness of Dimenhydrinate for Relief of Vestibular Reactions After Labyrinth Fenestration Operation**

	Symptoms: Day of Operation					Symptoms: Day After Operation †					Subsequent Reactions 48 Hours
Group	Vertigo	Nausea	Vomiting	Nystagmus	Diet	Vertigo	Nausea	Vomiting	Nystagmus	Diet	Postoperatively
Control ‡	Very severe	Severe	6-12 times	Severe	Absent	Moderate	Moderate	2-4 times	Moderate	Water in 50% of patients	Liquid diet tolerated with much nausea and occasional vomiting; patient up after 96 hr.; vertigo continued
Treated §	Moderate	Slight	1-3 times	Slight	Water in 7 patients	Very slight	Very slight, 10 patients no nausea	Absent	Very slight	Liquid and soft	Of 28 patients, 12 had occasional slight vertigo; 10 had occasional nausea; no patients vomited

* Prepared by Edward H. Campbell, M.D., Department of Otolaryngology, Graduate School of Medicine, University of Pennsylvania.
† Classification of postoperative reactions are uniform and standardized.
‡ No dramamine administered.
§ Twenty-eight patients comprise the group treated with dimenhydrinate after operation.

ANALYSIS OF DATA

Since motion sickness is associated with vestibular imbalance, the control of labyrinthitis and of Ménière's disease with dimenhydrinate was attempted. Often the diagnosis of these conditions is difficult; the ascertainment of the causative factor is equally difficult. Among the common causes of dizziness or vertigo are (1) damage to the vestibular nuclei or tracts in the central nervous system from streptomycin, (2) involvement of the vestibular end organs by infectious diseases of the ear (labyrinthitis), (3) endolymphatic hydrops (Ménière's disease), (4) trauma to the head associated with brain concussion, (5) changes in the vascular system causing sudden variations in cerebral blood pressure. Bleeding into the labyrinth is extremely rare. A total of 63 patients with acute or chronic labyrinthine symptoms have been treated with dimenhydrinate at the Johns Hopkins Hospital, by physicians elsewhere and by me.

The age range was 16 to 74 years. With six exceptions, this group of patients had had recurring attacks of vertigo with nausea and vomiting of varying severity for more than two years. The six exceptions were patients with acute violent symptoms of one to three weeks' duration. Nausea with vomiting occurred in 35 of the 63 patients. Ten patients had hypertension; 53 had normal blood pressure. The average dose of dimenhydrinate was 50 to 100 mg. every four hours, and the majority of the patients took the drug for at least seven months. Only two patients complained of excessive drowsiness, which was avoided by the administration of a smaller dose. It is noteworthy that 27 patients also had impaired hearing. The 63 patients were separated into three groups. The case histories of several patients in each group are presented. In group 1 are the six patients seen within three weeks after the onset of dizziness, nausea and vomiting (table 3).

TABLE 2.—*Summary of Results*

No. of patients treated with dimenhydrinate	28
Markedly relieved	8 (28.6%)
Considerably relieved	9 (32.1%)
Moderately relieved	11 (39.3%)
Relapses after discontinuation of drug with complete recovery by further administration of 100 mg. of drug	8

REPORT OF CASES

CASE 1.—A 36 year old Negro went on a four day alcoholic spree. On the fifth day, after he returned to work, he suddenly became dizzy and vomited. One month later he was brought to the accident room of the Johns Hopkins Hospital, because for at least three weeks the slightest movement of his head produced nausea, vomiting and dizziness, whether he was standing upright or lying down. The physical examination was normal, but it was made under difficult conditions since any movement

of his head or body caused nausea, vomiting and dizziness. Fine nystagmoid movements of the eyes were noted on extreme lateral deviation. The Wassermann reaction of the blood was positive, but the spinal fluid reaction was negative. Roentgenographic study of the skull disclosed no abnormalities. A caloric test with cold water elicited a normal response on both sides.

The patient experienced dizziness, nausea and vomiting on the slightest movement during the first five days. He could retain nothing given by mouth. Among the diagnoses considered were toxic labyrinthitis, syphilitic labyrinthitis or possibly a tumor involving the fourth ventricle.

All medication failed to relieve his symptoms until he was given 200 mg. of dimenhydrinate by mouth on the sixth day after admission. After the first dose there was a dramatic change. The patient's nausea and vomiting completely disappeared. He was able to get out of bed, to walk up and down two flights of steps unassisted and to stoop over repeatedly and pick up objects placed on the floor 6 feet apart with no return of symptoms. He was practically free from dizziness. He drank a large tumbler of water and repeated the tests with no discomfort. A maintenance dose of 100 mg. of dimenhydrinate was given three times daily for three days, during which time he ate, drank and moved about in comfort. Unknown to the patient a lactose placebo was substituted three times daily for three days. Within 18 hours, his dizziness, nausea and vomiting recurred. Again after the administration of dimenhydrinate (100 mg. three times a day) he was symptom free for six days. On the seventh day all treatment was discontinued, and within 12 hours he was as dizzy as he had been before administration of dimenhydrinate. A placebo was again given for two days with no relief. Dimenhydrinate was resumed with almost immediate relief. Thereafter he remained free from all symptoms and was discharged after 25 days in the hospital. After his discharge he continued to take 50-100 mg. of dimenhydrinate three times a day, and about 12 weeks from the onset his labyrinthine symptoms disappeared; they have not recurred during the past eight months. During his hospital stay he received 10,000,000 units of penicillin intramuscularly with no relief of his symptoms. His hearing was not affected by his illness.

CASE 2.—A 48 year old Negro woman had, with no apparent causes, an attack of acute vertigo, headache, nausea and vomiting. She had been adequately treated several years previously at the Johns Hopkins Hospital for syphilis. She was brought to the outpatient clinic in an ambulance, since she could neither stand nor walk without a tendency to fall. Movement of the head or eyes aggravated her symptoms. Within 30 minutes after the administration of 100 mg. of dimenhydrinate she sat up and walked without falling. She was advised to take 50 mg. of the drug three times daily and was sent home. She returned three days later; since her symptoms had not recurred the drug was discontinued. Two days later she was brought to the hospital with her original symptoms. She then took dimenhydrinate (50 mg. three times daily) for two weeks, with relief of all symptoms. There has been no recurrence during the past 10 months. The cause of this patient's acute symptoms is obscure. Vestibular studies suggested a central disturbance. Audiograms were normal.

CASE 3.—A member of the Faculty of the Johns Hopkins School of Hygiene and Public Health, aged 60, was awakened during the night by a violent attack of vertigo, nausea and vomiting. He had noticed impaired hearing on the right side. He attempted to carry on his duties the following morning, but it became necessary for an associate to take him home. He remained completely incapacitated for two days; then, because of dehydration from the excessive vomiting, he was admitted to the hospital. Within half an hour after admission he was given 100 mg. of dimenhydrinate by mouth. Recovery was so rapid that after one hour he was able to retain fluid and food. The otolaryngological study revealed total deafness of the right ear. Subsequently, 50 mg. of dimenhydrinate given three times daily for two weeks kept him free from all symptoms. He returned to his normal duties; however, he finds it necessary to take the drug occasionally, i. e., when a relapse occurs.

Regardless of the cause of the symptoms in these three patients, the acute labyrinthine disturbances completely subsided after the administration of dimenhydrinate. The other three patients in group 1 also had severe symptoms that responded with equal rapidity.

In group 2 are 41 patients who had suffered from dizziness, nausea and vomiting for periods varying from two months to 25 years (table 4). All these patients were either cured completely or had only infrequent and minor attacks as long as they continued to take dimenhydrinate.

CASE 8.—A woman, aged 71, had had dizziness and nausea for 15 months. For the seven months prior to the first consultation she had been more or less incapacitated and for several weeks had been in bed most of the time because of extreme dizziness. She also had rheumatoid arthritis and hypertension. Her hearing was moderately impaired in both ears. Results of caloric tests were normal. The vertigo seemed to be due to a circulatory disorder. All previous medication had failed to relieve her symptoms.

She was given 100 mg. of dimenhydrinate four times a day as an initial dose, but gradually this was reduced to 50 mg. three times a day. The first dose of 100 mg. gave immediate relief. She had been in bed for seven weeks, but within a week after taking the drug she was up, had no dizziness or nausea and was no longer unsteady on her feet. Dimenhydrinate was omitted on several occasions during the past 16 months, but her symptoms always recurred; it was found that a maintenance dose of 50 mg. daily was necessary for her comfort. Her blood pressure remains more or less constant at 170/100.

CASE 13.—A woman, aged 56, came to the hospital because of deafness. She complained of frequent spells of dizziness with nausea and vomiting. For these symptoms she had had a fenestration operation on the left side two years previously, with no relief. Physical examination disclosed bilateral impairment of hearing of mixed conductive and perceptive type, evidence of an old bilateral interstitial keratitis and a positive Wassermann reaction of the blood. The vascular system and spinal fluid were normal. The initial treatment was irradiation or removal of infected lymphoid tissue in the nasopharynx, sedation and a course of histamine therapy. Her symptoms persisted, and she was given dimenhydrinate which she has taken in doses of 50 mg. three times a day for the past 12 months with complete freedom from dizziness. During one week the drug was omitted, and within 24 hours the dizziness and nausea recurred.

This patient was also given a prolonged course of penicillin, since it was the opinion of the consultants that she had congenital syphilis. They also thought the symptoms referable to the ears were due to otosclerosis and not to syphilis. Regardless of the causative factor, the patient has been taking 50 mg. of dimenhydrinate three times a day for a year and has been completely free from dizziness, nausea and vomiting. During the year of therapy no side reactions developed from the drug.

CASE 16.—A man, aged 70, had gangrene of the left foot in 1943, due to occlusion of arterial blood supply. The leg was amputated above the knee. For one year prior to the first consultation, he had had extreme dizziness with no nausea or vomiting but constant annoying tinnitus. His symptoms had been so severe that for several months he had required assistance whenever he walked. On examination he was found to be undernourished and to have pronounced arteriosclerosis with a blood pressure of 250/110.

For relief of dizziness, 50 mg. of dimenhydrinate was prescribed three times daily. During a month of this therapy he was completely free from dizziness. The drug was then omitted for 12 days. A few hours after the drug was discontinued the dizziness recurred and continued until he resumed taking dimenhydrinate. He has been using the drug for four months and has had no recurrence of dizziness.

V 14
1951

In group 3 are 16 patients with symptoms similar to those in group 2. All failed to respond to dimenhydrinate (table 5). In fact, in five patients the dizziness became more pronounced after 100 mg. of the drug had been taken.

The dizziness, nausea and vomiting were so severe in four of the patients that the vestibular nerve was sectioned intracranially, with no relief. Dimenhydrinate, administered in doses of 400-600 mg. a day, failed to give the slightest relief. No explanation is offered for these 16 failures.

CASE 1.—A white woman, aged 67, began to walk unsteadily. This gradually became worse, and about five years ago she began to have severe attacks of vertigo. For this symptom a neurologist and a laryngologist were consulted. A diagnosis of Ménière's disease was made, and a year later the eighth nerve on the left side was sectioned. This stopped the severe spells of dizziness, but when the patient walks unsteadiness persists and, in fact, has increased. It was for this symptom and roaring in her ears that she came to the hospital for examination and advice. Results of the physical examination were normal, except for hypertension (blood pressure 180/105) which is known to have existed for at least five years. Dimenhydrinate in doses of 50 mg. every four hours for two weeks did not lessen her symptoms in any respect, and treatment with the drug was discontinued.

CASE 12.—A physician, aged 67, had had severe attacks of dizziness for 15 years. Occasionally, the dizziness had been associated with nausea and vomiting. Results of a physical examination were normal except for a definite hearing impairment in the right ear.

He had tried a salt-free diet, sedatives and neostigmine with no benefit. He was given dimenhydrinate, 100 mg. every four hours for a period of four weeks, with no relief. Histamine, however, did give him definite relief, and he maintained this improvement for a period of six months.

Of the 63 patients, the six in group 1 and 35 in group 2 (65.1 per cent) were greatly benefited; six patients in group 2 (9.5 per cent) were partially relieved; but all 16 patients in group 3 (25.4 per cent) failed to improve, even though adequate doses of dimenhydrinate were given. In other words, 74.6 per cent of the 63 patients with imbalance were greatly improved after taking the drug. Many of the patients had to continue maintenance doses to remain free from dizziness.

SUMMARY

During the past two years several investigations have thrown light on the action of dimenhydrinate (dramamine®). The research of Himwich indicates a central action. The investigations of Haley and Harris, and of Batterman point to local action on the blood vessels and on the labyrinth. The efficacy of dimenhydrinate in labyrinthine disturbance after fenestration has been demonstrated by Campbell. This report is a presentation of results obtained by the administration of dimenhydrinate (50 to 100 mg. every four hours) to patients with various types of dizziness of labyrinthine as well as of central origin. The benefits these patients derived from the drug show that dimenhydrinate should be given to all persons with disturbance of balance before recourse to section of the nerve by the neurosurgeon or to destruction of the labyrinth with alcohol injection or to electrocoagulation by the otologist.

ANTICONVULSIVE PROPERTIES OF DESOXYCORTICOSTERONE

Robert B. Aird, M.D.
and
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Interest in the potentialities of steroid hormones for the treatment of conditions other than specific hormonal deficiencies has been given recent impetus by the reports of the action of cortisone in rheumatoid arthritis,[1] of the action of desoxycorticosterone acetate and ascorbic acid in the same condition [2] and of the well known growth-promoting effects of testosterone compounds.[3] The anticonvulsive effects of desoxycorticosterone acetate have been demonstrated repeatedly in animals [4] since McQuarrie, Anderson, and Ziegler reported that desoxycorticosterone acetate prevented both the convulsive effects and alterations in electrolyte balance produced by vasopressin injection (pitressin®) in two patients with convulsive disorders.[5] Aird showed that the anticonvulsive action of desoxycorticosterone acetate was of limited duration when convulsions were experimentally induced by epileptogenous agents in mice. On the other hand, he found no alteration of the convulsive threshold of dogs to electrical stimulation following the administration of desoxycorticosterone acetate and was unable to show beneficial effects of this agent in two patients when it was administered as sublingual drops in a propylene glycol mestruum.[6] More recently, however, desoxycorticosterone has been available in tablet form for convenient sublingual or buccal administration, and its efficacy by this route has been clearly shown in the treatment of Addison's disease by Anderson and co-workers.[7] In view of the paucity of the clinical material reported, and more recent reports on the anticonvulsive effect of desoxycorticosterone acetate in animal experiments, it was thought worth while to renew clinical investigation on this subject, making use of the newer form of the compounds.[8]

The impetus for this study came as a result of our interest in the basic neurophysiological and biochemical mechanisms influencing convulsive reactivity. In view of the present cost of desoxycorticosterone acetate, it is obvious that this agent, even if found to be of some value in the treatment of convulsive disorders, would not constitute a practical addition to present methods of anticonvulsive therapy.

From the Convulsive Clinic of the Division of Neurology and the Endocrine Clinic of the Division of Medicine, University of California School of Medicine.

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8. Ciba Pharmaceutical Products, Inc., Summit, N. J., supplied the desoxycorticosterone acetate (percorten linguets®) and desoxycorticosterone glucoside solution used in this study.

As Toman and Goodman [9] have pointed out, the final test of anticonvulsive action must necessarily be evaluated in patients. These authors have also stated that the clinical trial of new agents on refractory patients, whose seizures have resisted all ordinary therapy, places an undue burden of proof on the test agent. On the other hand, if an agent is clearly effective under such rigorous conditions, it would seem to us that its efficacy is the more certainly established.

CLINICAL MATERIAL AND METHODS OF STUDY

Ten refractory patients were selected who had been under observation for a number of years and whose seizures had not been adequately controlled in spite of persistent therapeutic efforts. The group studied consisted of 6 patients with convulsive states of undetermined origin (idiopathic) and 4 patients with symptomatic or secondary convulsive disorders. Combined forms of seizures occurred in 6 of the 10 patients. Altogether, as shown in the table, 8 had petit mal, 6 had grand mal and 3 had jacksonian seizures. Two additional patients were treated with desoxycorticosterone acetate but were excluded from the study because of complicating psychiatric factors that made an adequate evaluation of their response to therapy impossible. The 10 patients included in this study were those whose seizures occurred with reasonably constant frequency. Patients with hypertension or cardiac failure were not included. The number and types of seizures were recorded

Types of Convulsive States and Effects of Desoxycorticosterone Acetate in Ten Refractory Patients

Convulsive State	Number of Patients*	Therapeutic Effects		
		Untoward	None	Improved
Petit mal.....	8	0	2	6
Grand mal.....	6	0	5	1
Jacksonian	3	0	3	0

* Combined forms of convulsive seizures occurred in 6 patients.

for periods ranging from one to four months prior to the addition of desoxycorticosterone acetate to their anticonvulsive regimen.

In all instances, desoxycorticosterone was added without altering other therapeutic measures that had been found to aid in the control of the patients' convulsive states. Standardization of the therapeutic regimen prior to the time desoxycorticosterone acetate was added included control of the water balance (slight dehydration) and acid-base balance (neutral to slight acidosis), elimination of alcohol and stimulants and regulation of other factors that might influence convulsive reactivity. In addition, optimal doses were maintained of such specific anticonvulsive agents as phenobarbital, diphenylhydantoin (dilantin®) sodium, mesantoin® (3-methyl-5,5-phenylethyl hydantoin), trimethadione (tridione®) and glutamic acid as previously determined for each patient.

The patients were carefully instructed in the technic of sublingual medication. As with other sublingual tablets, the desoxycorticosterone acetate linguets® are designed to dissolve in half an hour in the sublingual position or longer in the buccal pouch and do not produce salivation or an unpleasant taste.[10] Each patient was advised to allow the tablet to dissolve slowly at times when dissolution would not be hastened by eating, drinking, talking or moving the tongue about. After test periods of one or more months, identical but inert placebo tablets were substituted for the desoxycorticosterone acetate tablets for short periods in order to evaluate the possible psychotherapeutic effects of the impressive sublingual procedure. Blood pressure, weight and presence or absence of edema were recorded at each visit. The exact number of attacks was recorded by the patient or a competent member of the patient's household.

9. Toman, J. E. P., and Goodman, L. S.: Physiol. Rev. **28**: 409, 1948.
10. Escamilla, R. F., and Gordan, G. S.: J. Clin. Endocrinol. **10**: 248, 1950.

RESULTS

In 7 of the 10 patients there was a definite diminution in the number of attacks on institution of therapy with desoxycorticosterone acetate in doses varying from 4 to 15 mg. a day. In the group benefited by desoxycorticosterone acetate, substitution of placebo tablets was accompanied with an exacerbation of the convulsive tendency, usually on the fourth day, and in one patient the relapse assumed the proportions of status epilepticus. Although the evidence is obviously too limited to permit the relative evaluation of the effect of desoxycorticosterone acetate on the different types of convulsive disorders, desoxycorticosterone acetate would appear to be of primary value for patients with petit mal and possibly of some value for occasional patients with grand mal.

In three patients with jacksonian epilepsy no definite effect was observed from desoxycorticosterone acetate therapy.

It is well known that desoxycorticosterone acetate in overdosage can produce retention of salt and water, with clinical edema and hypertension. For this reason, careful examination of the patients has been carried out at each visit with particular reference to weight, blood pressure and edema. Fortunately, there have been no untoward effects from desoxycorticosterone acetate in our patients in the 2½ years during which this study has been conducted. The blood pressure has not approached hypertensive levels in any of the patients studied to date. Three patients with a previously existing tendency toward mild arterial hypotension have had slight rises in blood pressure to normal levels during therapy. Retention of salt and water, as manifested by gain of weight or occurrence of edema, has not been encountered. No clinical evidence of adrenal cortex insufficiency has been observed in any of the patients.

REPORT OF CASES

The observed beneficial effects of desoxycorticosterone acetate are exemplified in the following case reports.

CASE 1.—G. K., a 15 year old schoolgirl, complained of "spells" of three years' duration. Her spells were described as "light" and "heavy." The "light" spells consisted in slight jerking of her hands, and some stiffening of her body, but no loss of consciousness, and lasted only a few seconds. Her "heavy" spells were typical tonic and clonic grand mal spells of some two minutes' duration. The "light" spells varied in frequency from five to 26 a month, while the "heavy" spells occurred from 0 to two or more times a month. In addition, she had typical petit mal spells which occurred one to five times a day. Her spells were likely to occur at the time of her menstrual period. Aside from this, however, no contributing or precipitating factors were known to be associated with her convulsive state.

Various anticonvulsive agents had been tried with little success. These included diphenylhydantoin, phenobarbital, mesantoin® and trimethadione. At the time of her referral, she was taking 0.1 Gm. of mesantoin® four times a day, 0.3 Gm. of trimethadione three times a day, and 0.03 Gm. of phenobarbital four times a day. Moderate sedation had resulted as indicated by her tendency to fall asleep throughout the day and by her slow speech and reaction time.

Results of physical and neurological examinations were essentially within normal limits aside from (1) a slight tremor of her hands and a fine rapid and horizontal nystagmus on lateral gaze, which was attributed to the diphenylhydantoin and (2) her thick speech and slow mental reactions.

V 14
1951

Routine laboratory studies, including complete blood counts, determination of sedimentation rate, urinalysis, tuberculin test, stool examination and blood Wassermann test disclosed normal results. Psychometric studies showed an intelligence quotient of 102. Roentgenograms of her skull were normal. A lumbar puncture showed normal pressure and dynamics. The cerebrospinal fluid contained no cells and a total protein content of 39 mg. per 100 cc.; the colloidal gold curve was flat. A previous electroencephalogram had been interpreted as normal.

Fig. 1 (case 1).—Effect of desoxycorticosterone in a case of idiopathic convulsive seizures.

Repeated electroencephalograms showed sporadic 4 to 7 cycle waves in all leads and typical sequences of waves and spikes with hyperventilation. A pneumoencephalogram with adequate exchange was interpreted as normal.

A diagnosis of a convulsive state of both the petit mal and the grand mal type was made.

Further combinations of therapy were tried with more adequate stabilization of the fluid and acid-base balances. Use of mesantoin,® diphenylhydantoin, mephobarbital (mebaral®) and two new anticonvulsive agents resulted in some improvement, especially in regard to the grand mal attacks and the drowsiness. The minor spells continued, however, at an average frequency of 26 a month.

To an anticonvulsive regimen of 0.1 Gm. of mesantoin® four times a day, and 0.1 Gm. of mephobarbital at bedtime, 5 mg. of desoxycorticosterone acetate, twice a day sublingually, was added. The spells promptly diminished in frequency, as shown in chart 1. Eight weeks after this treatment was started she had no further spells, even though the dose of desoxycorticosterone acetate was reduced to 2 mg. twice a day. The patient continued to be free of seizures for a period of five months and was then permitted to attend public school (she had previously required private tutoring at home). Occasional minor spells recurred after she returned to school and to a full schedule that taxed her physically, mentally and emotionally.

Case 2.—C. R. M., a 25 year old married woman, had a history of a convulsive state of 14 years' duration. At the age of 11 years she was hit in the left frontal region with a baseball bat. She was not unconscious at any time but was dazed for an hour or so afterward. Approximately six months after this injury, she had the first of her subsequently frequent convulsive episodes. These consisted of both grand and petit mal convulsions, which varied in frequency from one every two to three months to seven or eight a day. These episodes were usually preceded by an aura, consisting chiefly of a strange feeling in the head involving the right side more than the left. Early in the course of the disorder she had occasional visual hallucinations.

Bromides and phenobarbital had been tried since she was 13 years old. Because her spells continued, she was referred to the University of California Medical Center in 1943, since which time she had been observed in the hospital and in the outpatient department. Initially she was treated with an anticonvulsive regimen consisting of 0.1 Gm. of diphenylhydantoin sodium three times a day, and 0.1 Gm. of mephobarbital three times a day. The frequency and severity of her seizures were much diminished over the subsequent two years. By September 1946, the patient's grand mal episodes had almost entirely ceased. Because considerable hypertrophy of the gums had developed, smaller doses of diphenylhydantoin were prescribed, and one year later mesantoin® was substituted for it. Prior to her inclusion in the present series her seizures had increased in frequency again, and nine months before she was first given desoxycorticosterone she went into "status epilepticus." Thereafter she had from six to 36 grand mal spells a month and five to 30 or more petit mal spells a day. In addition, some clumsiness of the right hand and, to a less degree, of the right leg had developed. Her memory had shown progressive deterioration. For approximately 11 months she had been aware of a numbness over the entire right side of her body similar to that noticed during her episodes, and it now was almost continually present. Because of these changes she was again brought into the hospital, in 1948, for reexamination and repeated pneumoencephalograms. She was discharged with instructions to take 0.1 Gm. of mesantoin® five times a day, 0.03 Gm. of phenobarbital three times a day and 3 Gm. of racemic glutamic acid hydrochloride three times a day with meals. During the following month her mental status seemed to improve and she had no further convulsive seizures. Approximately one month later, however, she was again having as many attacks as before, which led to her inclusion in the desoxycorticosterone acetate series.

Her past and family histories were noncontributory.

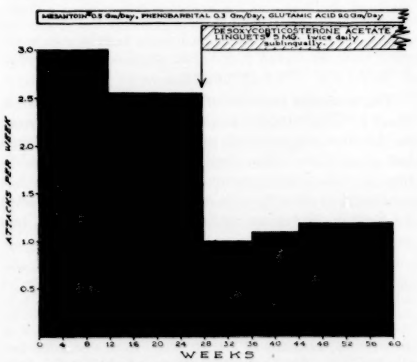
MESANTOIN® 0.5 Gm/day, PHENOBARBITAL 0.3 Gm/day, GLUTAMIC ACID 9.0 Gm/day
DESOXYCORTICOSTERONE ACETATE LINGUETS® 5 MG. twice daily sublingually
ATTACKS PER WEEK
WEEKS

Fig. 2. (case 2).—Effect of desoxycorticosterone in a case of post-traumatic convulsive seizures.

Results of routine laboratory studies, including complete blood counts, urinalysis and a blood Wassermann test, were either negative or normal. Roentgenograms of her skull disclosed no abnormalities. An electroencephalogram showed both generalized and focal dysrhythmias of nonspecific type. The focal dysrhythmia involved the left cerebral cortex rather diffusely. The right frontal and parietal regions also appeared involved to some extent. A glucose tolerance test elicited normal results. The cerebrospinal fluid contained normal cells and

protein and the Wassermann reaction was negative. The colloidal gold curve was normal.

The pneumoencephalogram in 1943 demonstrated a dilated left lateral ventricle, as well as some dilatation of the third ventricle. There was considerable dilatation of the supracortical subarachnoid spaces, especially on the left side. The pneumoencephalogram in 1948 showed that both the lateral ventricles were larger than they were in 1943, while the appearance of the subarachnoid channels had not changed.

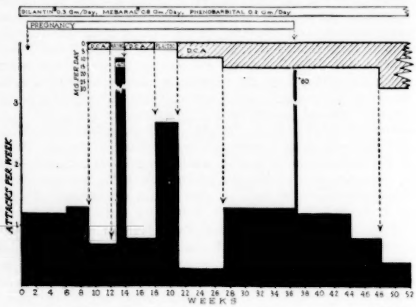

Fig. 3 (case 3).—Effect of desoxycorticosterone in a case of idiopathic seizures complicated by pregnancy.

A diagnosis of a convulsive state of the grand and petit mal types and of a probable post-traumatic origin was made.

After seven months of further observation, during which the patient's attacks averaged 15 a month, desoxycosticosterone acetate was administered by sublingual tablets, 5 mg. twice a day. This agent was added to her regimen of mesantoin,* phenobarbital and racemic glutamic acid hydrochloride as noted above. In the following four months her attacks decreased to five a month and she showed further improvement. The dose of desoxycorticosterone acetate was then increased to 5 mg. three times a day. Although her spells continued at the rate of approximately five to seven a month in the next two months, they were definitely less severe and prolonged. She did not lose consciousness entirely, even in her worst spells during this period. She stated that she felt better in general and "like a new person."

The essential features of this case are presented in chart 2. This patient's response is typical of the group in that the frequency of seizures was clearly reduced but seizures were not completely abolished by the addition of desoxycorticosterone acetate. The patient has continued to do well, with only one attack a week, with no further change in medication for a period of two years.

CASE 3.—R. C. C., a 22 year old married woman, had experienced petit mal and occasional grand mal seizures over a period of 20 years. The petit mal spells occurred as often as three or four a day but with free periods of one to two weeks. The grand mal spells were initiated by turning of her head to the right and extension of her left arm. There then developed a generalized tonic and clonic seizure which persisted from two to five minutes and was followed by a dazed period of approximately one-half hour in which she stuttered or talked nonsense. Her spells were not related to time, place or circumstance. Previous treatments, including fluid restriction, ketogenic diet, allergy diets and diphenylhydantoin had given no relief. Phenobarbital had been of moderate help. Combinations of diphenylhydantoin, mesantoin,* phenobarbital and mephobarbital had given moderate relief for periods in the seven years she was observed by one of us. In the past six months she still had two to five light grand mal spells a month and an occasional series of petit mal spells, which usually occurred in the week previous to her menstrual period.

Results of physical and neurological examinations were essentially normal. Routine laboratory studies, including complete blood count, urinalysis and blood Wassermann test, elicited negative or normal results. A study of cerebrospinal fluid pressure, dynamics, cell count, chemical analysis and Wassermann reaction disclosed normal results. An electroencephalogram showed a general dysrhythmia of nonspecific type and a suggestive irritative focus in the temporal lobe secondarily involving adjacent areas on the right side. A pneumoencephalogram with an exchange of 120 cc. of cerebrospinal fluid and ethylene was interpreted as within the limits of normal.

Desoxycorticosterone acetate sublingual tablets, 2 mg. twice a day, were added to her previous anticonvulsive regimen, which consisted of 0.1 Gm. of diphenylhydantoin three times a day, 0.1 Gm. of mephobarbital three times a day and 0.06 Gm. of phenobarbital at bedtime. As may be seen in chart 3, the frequency of her spells was reduced by approximately one half.

Shortly after this patient was given desoxycorticosterone acetate sublingual tablets, it became apparent that she was pregnant. As she had fewer attacks while taking the agent and had an unaccustomed feeling of well-being, it was decided that the possible psychological effects of sublingual therapy should not be terminated. On the other hand, we were concerned with the possibility of deleterious effects which desoxycorticosterone acetate might have upon the fetus. For these reasons, placebo tablets were substituted. Very frequent seizures occurred on the fourth day of this program, leading to the resumption of use of desoxycorticosterone acetate linguets.* This resulted in a prompt diminution in the frequency of attacks. Two months later we again became concerned about possible effects of the hormone on the fetal adrenal cortex and once more substituted placebo sublingual tablets. This substitution resulted in another exacerbation of the patient's convulsions. Desoxycorticosterone acetate tablets were again administered, and the exacerbation was rapidly controlled. During labor the patient had numerous minor seizures, but she delivered a normal boy and has subsequently been more nearly free of attacks than she had ever been.

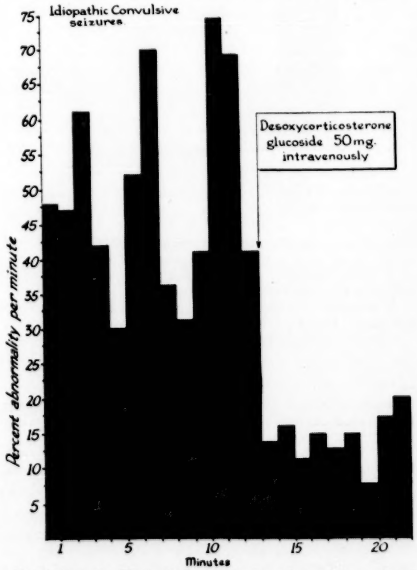

Fig. 4 (case 4).—Effect of desoxycorticosterone glucoside on electroencephalographic abnormalities in a case of idiopathic seizures.

V 14
1951

COMMENT

The initial rationale for McQuarrie's use of desoxycorticosterone acetate as an anticonvulsive agent was based on the fact that this compound produces retention of salt and reverses the diluting effect of vasopressin. The deleterious effects of vasopressin on patients with convulsive tendencies are well established. One might theorize that factors that tend to make the internal environment hypotonic also tend to enhance convulsive susceptibility, while factors predisposing to hypertonicity reverse this tendency.[11]

Other mechanisms have been postulated and studied. Alterations of tissue permeability of the cerebral cortex and of the blood-brain barrier have been suggested as the mechanism of action of desoxycorticosterone acetate.[6] It has also been shown that steroids may directly depress the metabolism of brain cells.[12] Of recent interest is the observation of Woodbury, Cheng, Sayers and Goodman that the protection which desoxycorticosterone acetate provides against electrically induced convulsions is lost if the animal receives pituitary adrenocorticotropic hormone simultaneously.[13] These authors suggested that their results might be interpreted to indicate that at least part of the action of desoxycorticosterone acetate in the intact animal may be attributed to suppression of pituitary adrenocorticotropic activity, with a consequent reduction in the secretory activity of the adrenal cortex. In view of recent reports that cortisone increases abnormalities in the electroencephalogram,[14] this hypothesis is worthy of added consideration.

In this connection we have studied the effect of the water-soluble conjugate, desoxycorticosterone glucoside, administered intravenously on the electroencephalograms of normal persons and of persons with convulsive tendencies. No effect was observed after the administration of 50 mg. of desoxycorticosterone glucoside intravenously to two persons with normal electroencephalograms. In 6 patients with abnormalities associated with convulsive tendencies, the conjugate produced a small but consistent decrease in the frequency of abnormal waves. In chart 4 is plotted the frequency of abnormal waves per minute before and after administration of the compound to one of the six patients. Although this was the most striking case, a suggestive reduction in the incidence of abnormal activity was similarly observed in the other five patients.

SUMMARY

Although desoxycorticosterone acetate has been suggested as an anticonvulsive agent, clinical data regarding its efficacy are meager and conflicting. In order to test its anticonvulsive activity more thoroughly, desoxycorticosterone acetate was administered as sublingual tablets, in doses varying from 4 to 15 mg. a day, to 10 patients whose convulsive seizures were inadequately controlled on standard anticonvulsive regimens. Because these patients had proved refractory to previous anticonvulsive therapy, desoxycorticosterone acetate was added to those combinations of other agents that had been found to be helpful. The number of seizures in each patient was recorded for several months before addition of the steroid, and only those patients were selected who had a fairly constant base line.

When desoxycorticosterone acetate was added to the regimen, the attacks became more infrequent in seven patients; the medication appeared to benefit the petit mal spells in six of these patients and the grand mal seizures in two of them. In two instances seizures were entirely abolished. Substitution of placebo tablets in the group that appeared to be benefited by desoxycorticosterone acetate resulted in a dramatic resumption or increase in the number of seizures in two patients and approximated status epilepticus in one patient. Reinstitution of the hormonal therapy in these cases again resulted in an amelioration of the convulsive tendency. During the period of treatment with desoxycorticosterone acetate there was no significant increase in blood pressure or weight or any evidence of edema.

Administration of the water-soluble conjugate, desoxycorticosterone glucoside, tended to reduce the incidence of abnormal waves in the electroencephalogram.

In conclusion, therefore, these data suggest that desoxycorticosterone acetate, at least when used as an adjuvant to other anticonvulsive therapy, possesses anticonvulsive properties in petit mal and possibly to some extent in grand mal.

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12. Gordan, G. S., and Elliott, H. W.: Endocrinology **41**: 517, 1947. Eisenberg, E.; Gordan, G. S., and Elliott, H. W.: Science **109**: 337, 1949. Eisenberg, E.; Gordan, G. S., and Elliott, H. W.: Endocrinology **45**: 113, 1949.

13. Woodbury, D. M.; Cheng, C.-P.; Sayers, G., and Goodman, L. S.: Am. J. Physiol. **160**: 217, 1950.

14. Boland, E. W., and Headley, N. E.: J. A. M. A. **141**: 301 (Oct. 1) 1949.

DEATH TOLL FROM RHEUMATIC FEVER IN CHILDHOOD

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The importance of rheumatic fever and its aftereffects as a cause of mortality in childhood has been stressed more and more in discussions from all parts of the world, particularly the United States. A statistical survey has recently been issued by the Children's Bureau [1] to shed more light on the differences in mortality from rheumatic fever and heart diseases in the United States, its sections and the individual states. In order to diminish chance fluctuations, which necessarily become large in individual states when the total is split into the respective age, race and sex groups, three year averages of the mortality data, 1939-1941, have been taken and centered on the population of the census of 1940. Exact data on population in the individual states by age, race and sex are available only for the years of census enumerations. However, for the United States as a whole additional data are shown for more recent single years up to 1948 as published by the National Office of Vital Statistics.

Formerly Health Research Analyst, Division of Statistical Research, Children's Bureau, Federal Security Agency.

1. Wolff, G.: Childhood Mortality from Rheumatic Fever and Heart Diseases, Children's Bureau Publication 322, Federal Security Agency, 1948. This monograph contains the pertinent source materials of the detailed study and also more technical bibliographic references.

TOTAL DEATH TOLL

During the three years from 1939 to 1941, a total of 12,037 deaths from heart diseases (all forms) and 2,538 deaths from acute rheumatic fever were counted in persons under 20 years of age; altogether 14,575 deaths, or nearly 5,000 deaths per year. Considering that in the age group under 5 years most fatal heart diseases are not of rheumatic origin and that in later childhood (5 through 19 years) some deaths from heart diseases (perhaps 10 per cent) may also not be of rheumatic etiology, there remains a minimum of approximately 12,000 deaths caused by acute rheumatic fever and its after-effects in the years of childhood (under 20 years), or about 4,000 annual deaths. In the years following 1941 the annual death toll has further decreased from 4,042 in 1942 to 2,988 in 1946, to 2,627 in 1947, and to 2,515 in 1948, there being taken into

TABLE 1.—*Deaths from Acute Rheumatic Fever and Diseases of the Heart in Persons Under 20 Years by Age Groups: United States, 1939-1941 and Single Years, 1942-1948*

Years, Cause of Death	Under 5 Years	5-9 Years	10-14 Years	15-19 Years	Under 20 Years	
1939-1941 (3 years)						
Acute rheumatic fever....	251	754	934	599	2,538	14,575
Diseases of the heart....	2,088	1,944	3,391	4,704	12,037	
1939-1941 (annual average)						
Acute rheumatic fever....	84	251	311	200	846	4,858
Diseases of the heart....	696	648	1,100	1,568	4,012	
1942						
Acute rheumatic fever....	85	211	246	172	714	4,042
Diseases of the heart....	557	520	837	1,414	3,328	
1943						
Acute rheumatic fever....	79	190	212	176	657	3,882
Diseases of the heart....	475	489	877	1,384	3,225	
1944						
Acute rheumatic fever....	94	206	241	192	733	3,800
Diseases of the heart....	522	494	850	1,201	3,067	
1945						
Acute rheumatic fever....	77	225	216	164	682	3,482
Diseases of the heart....	453	502	773	1,072	2,800	
1946						
Acute rheumatic fever....	90	156	192	129	567	2,988
Diseases of the heart....	426	380	656	959	2,421	
1947						
Acute rheumatic fever....	59	153	172	94	478	2,627
Diseases of the heart....	398	339	555	857	2,149	
1948						
Acute rheumatic fever....	68	151	152	87	458	2,515
Diseases of the heart....	394	337	529	797	2,057	

this account all deaths of persons under 20 years from acute rheumatic fever plus all deaths from heart diseases. The actual decrease in the rates will be discussed later, when the trend of mortality from rheumatic fever between the two world wars is dealt with.

Since in the opinion of clinical experts the majority of all deaths from heart disease (approximately 90 per cent) among school age children (5 through 19 years of age) is of rheumatic origin [2] the deaths listed on the death certificates as specifically due to chronic rheumatic diseases of the heart are an evident understatement. Therefore, in keeping with former investigators, mortality from all heart diseases in children, 5 to 19 years of age, is taken as a better estimate or "index of rheumatic heart disease mortality" [3] in childhood. To this number the deaths from acute rheumatic fever can easily be added to get the total death toll from acute rheumatic fever and its consequences (table 1).

COMPARISON WITH OTHER LEADING CAUSES OF DEATH

By comparing the six leading causes of death in school age and youth (5 through 9, 10 through 14 and 15 through 19 years) it can be seen that, disregarding accidents, with increasing age of the children mortality from acute rheumatic fever plus diseases of the heart holds an increasingly high place among fatal diseases in the white population of the ages 5 through 19 years. In the nonwhite population by far the greatest killer is still tuberculosis, especially for the girls entering the childbearing age. It is remarkable also that the same nonwhite girls, 15 through 19 years old, suffer a decidedly higher mortality from heart diseases than the nonwhite boys of this age, which parallels the situation in mortality from tuberculosis (table 2).

Age-specific, race-specific and sex-specific death rates for the six leading causes of death (in these age groups) for the three year period 1939-1941 are given in table 2 in the order of the rate for males. (The rank for females is given in parentheses.) These data show clearly the relative importance of rheumatic fever and heart diseases at different ages in both races and both sexes. Among white children in all age groups the latter conditions are a principal cause of death and are of increasing importance with increasing age; among white children 10 through 14 years of age and white boys 15 through 19 years of age they are the leading cause of death, if accidents are disregarded. Among nonwhite children of all ages tuberculosis and usually pneumonia take a higher toll than heart disease plus rheumatic fever.

From these and other statistics listed, it may be concluded that the epidemiology of rheumatic fever resembles that of tuberculosis in various aspects. These findings stress the fact that in rheumatic fever, as in tuberculosis, the social factor plays a part in the cure or fatal outcome of the disease.

Similar conclusions have been advanced for England and Wales by Morris and Titmuss,[4] who in a careful study, based on the Registrar General's mortality statistics for five social-occupational groups, recognize juvenile rheumatism as one of the group of social diseases. Unfortunately, the mortality statistics in the United States do not yet provide materials for directly associating the frequency of death or causes of death with certain occupational or social-economic groups of the population. But the results obtained for the white and the nonwhite group (in which the total population of the United States as well as the annual deaths are subdivided) may serve as proof that rheumatic fever with its after-effects is another chronic disease that is

2. *(a)* Wyckhoff, J., and Lingg, C.: Statistical Studies Bearing on Problems of Classifications of Heart Disease, Am. Heart J. **1**: 446-470, 1926. *(b)* Cohn, A. E.: Heart Disease from the Point of View of the Public Health, ibid. **2**: 275-301 and 386-407, 1927. *(c)* Wilson, M. G.: Rheumatic Fever: Studies of the Epidemiology, Manifestations, Diagnosis, and Treatment of the Disease During the First Three Decades, New York, Commonwealth Fund, 1940. *(d)* Paul, J. R., and others: The Epidemiology of Rheumatic Fever and Some of Its Public Health Aspects, ed. 2, New York, Printed for the American Heart Association by the Metropolitan Life Insurance Company, 1943.

3. Hedley, O. F.: Trends, Geographical and Racial Distribution of Mortality from Heart Diseases Among Persons 5-24 Years of Age in the United States During Recent Years (1922-36): Preliminary Report, Pub. Health Rep. **54**: 2271-2297, 1939.

4. Morris, J. N., and Titmuss, R. M.: Epidemiology of Juvenile Rheumatism, Lancet **2**: 59-63, 1942.

V 14
1951

influenced by adverse conditions of the social environment, as it has been demonstrated from many countries for tuberculosis.[5]

TREND IN MORTALITY FROM RHEUMATIC FEVER BETWEEN THE TWO WORLD WARS

The fact that rheumatic fever and heart disease have now become one of the leading causes of death among children is due to a decline in other childhood diseases and not to an increase in mortality from rheumatic fever. Table 3 shows the death rates for acute rheumatic fever and for diseases of the heart by age, race and sex for the period between World War I and World War II.

demonstrate consistently higher death rates from rheumatic fever and heart diseases than the white.

How far the statistics reflect the true epidemiological trends of rheumatic fever among white and nonwhite children during recent decades is open to question. It is improbable, though, that the socioeconomic conditions, including availability of medical services to nonwhite children, were so superior in the earlier period as to produce these results. The most plausible explanation of the apparently increased mortality rates or of smaller gains in reduced mortality would seem to be that for nonwhite children the reliability of the medical diagnoses and their reporting on the death certificates has improved (table 3).

TABLE 2.—*Rank of Six Leading Causes of Death in Childhood, 5-19 Years, by Age, Race and Sex: United States 1939-1941*

Average Annual Death Rates per 100,000

Leading Causes of Death in Order of the Rates for White Males	White Male	White Female (Rank in Parentheses)	Leading Causes of Death in Order of the Rates for the Nonwhite Males	Nonwhite Male	Nonwhite Female (Rank in Parentheses)
5-9 Years					
Accidents (169-195)	39.3	20.0 (1)	Accidents (169-195)	42.6	26.7 (1)
Pneumonia and influenza (107-109, 33)	10.2	9.0 (2)	Pneumonia and influenza (107-109, 33)	21.2	18.1 (2)
Appendicitis (121)	8.2	6.7 (4)	Tuberculosis (12-22)	16.4	14.7 (3)
Rheumatic fever (58) and diseases of the heart (90-95) 2.1 / 5.5	7.6	2.4 / 5.6 / 8.0 (3)	Rheumatic fever (58) and diseases of the heart (90-95) 2.9 / 9.3	12.2	3.7 / 9.3 / 13.0 (4)
Diseases of the ear, nose, and throat (89, 104, 115)	5.3	4.7 (5)	Diseases of the nervous system (80-88)	6.4	5.3 (6)
Diseases of the nervous system (80-88)	4.9	4.1 (6)	Appendicitis (121)	5.8	5.6 (5)
10-14 Years					
Accidents	40.9	12.2 (1)	Accidents	56.2	14.5 (4)
Rheumatic fever and diseases of the heart 2.4 / 8.8	11.2	2.5 / 9.2 / 11.7 (2)	Tuberculosis	22.3	39.0 (1)
Appendicitis	9.0	6.9 (4)	Pneumonia and influenza	17.4	16.3 (3)
Pneumonia and influenza	7.0	7.1 (3)	Rheumatic fever and diseases of the heart 3.8 / 11.3	15.1	4.2 / 13.2 / 17.4 (2)
Diseases of the nervous system	4.9	3.5 (5)	Appendicitis	10.1	7.2 (5)
Diseases of the ear, nose, and throat	3.3	3.2 (6)	Diseases of the nervous system	7.8	6.4 (6)
15-19 Years					
Accidents	74.1	19.8 (1)	Accidents	98.1	21.1 (5)
Rheumatic fever and diseases of the heart 1.6 / 12.7	14.3	1.4 / 11.2 / 12.6 (3)	Tuberculosis	97.2	159.7 (1)
Appendicitis	11.2	6.6 (6)	Homicide (165-168)	36.4	15.2 (6)
Tuberculosis	10.7	18.9 (2)	Pneumonia and influenza	30.0	30.9 (3)
Pneumonia and influenza	10.4	7.5 (5)	Rheumatic fever and diseases of the heart 2.2 / 15.7	17.9	2.2 / 21.6 / 23.8 (4)
Diseases of pregnancy (140-150)	....	11.3 (4)	Diseases of pregnancy (140-150)	....	62.3 (2)

The numbers in parentheses after causes of death are those of the International List, Fifth Revision, of 1938; they are not repeated for the different age groups.

The most impressive fact brought out by this table is the distinct decrease in mortality among white children reported over the past decades. This decrease, from 1919-1921 to 1944 and 1945, is about 70 per cent for the age groups 5 through 9 and 10 through 14, and 60 per cent for the age group 15 through 19 years, and the downward trend continues up to the present.

However, the story is very different for nonwhite children. Among these children no consistent downward trend is visible, except in the age group 15 through 19 years. Even this decrease is far behind that of the white adolescents in both sexes and amounts to hardly more than 25 per cent from 1919-1921 to the report in 1944. Only in the last three years of the present survey, 1945, 1946 and 1947, was the decrease somewhat larger.

On the other hand, it appears from the reported figures that in the early period (1919-1921) the nonwhite children had very low death rates, lower indeed in most instances than those of the white children. This result is contrary to later experience in the detailed study of the 1939-1941 period and in all following years, when the nonwhite children almost everywhere

AGE, RACE AND SEX DIFFERENCES

The age, race and sex differences in mortality from rheumatic fever and heart disease throughout the United States are shown graphically in the chart. The exact rates on which the chart is based can be found in table 3.

The chart shows clearly the rise in the mortality rate in each succeeding age group. This is true for both races and both sexes. The chart also shows plainly the much higher rates for nonwhite children than white in both sexes and all age groups.

The racial difference in rheumatic fever mortality is not so great as in some other diseases that are aggravated by unfavorable socioeconomic conditions, such as tuberculosis, syphilis and malaria, but the pattern is sufficiently strong to suggest that a more unfavorable environment, which doubtless exists for the nonwhite group, tends to increase the risk of dying from rheumatic diseases. That is, rheumatic fever appears to belong to that group of diseases in which, besides the specific etio-

5. Wolff, G.: Tuberculosis and Civilization: I. Basic Facts and Figures in Epidemiology of Tuberculosis, Human Biol. **10**: 106-123, 1938; Tuberculosis and Civilization: II. Interpretation of Etiological Factors in Epidemiology of Tuberculosis, ibid. **10**: 251-284, 1938.

logical agent, the social environment (here reflected in racial grouping) plays an aggravating part.

The race differences in the geographic divisions are more closely tested in the detailed study by considering the chance errors of the death rates. This comparison between white and nonwhite children shows in most geographic divisions a higher mortality among the nonwhite children, though the differences, even when great as in New England or the West North Central division, are not always statistically significant. The racial differences have the most significance in the Middle Atlantic (great differences) and the South Atlantic (small differences) division. There is only one consistent exception, the Mountain division, which shows higher death rates for the white children than for the nonwhite.

Generally speaking, mortality rates from acute rheumatic fever and diseases of the heart combined are somewhat higher among girls than boys. A marked exception is the lower rate for white girls as compared with white boys in the 15 through 19 year old group. The tendency toward higher rates for girls than for boys is most pronounced in the age group 15 through 19 years among nonwhite children.

REGIONAL VARIATIONS

Mortality from acute rheumatic fever and diseases of the heart varies among the geographic divisions of the United States. For both white and nonwhite children, the death rates for acute rheumatic fever plus heart diseases are below average in the South, while in the Northeast, especially in the Middle Atlantic division, they are significantly above average. In the Pacific division the death rates are as low as in the South and significantly below the country's average, while in the Mountain division they are exceptionally high for the white children in all age groups.

TABLE 3.—*Death Rates for Acute Rheumatic Fever and Diseases of the Heart in Children, 5-19 Years, by Age, Race and Sex: United States Death Registration States, 1919-1921, 1929-1931, 1939-1941 and Single Years, 1942-1947*

Average Annual Death Rates per 100,000

	White						Nonwhite					
	5-9 Years		10-14 Years		15-19 Years		5-9 Years		10-14 Years		15-19 Years	
Years, Cause of Death	M	F	M	F	M	F	M	F	M	F	M	F
1919-21												
Acute rheumatic fever	4.4	4.1	4.5	5.3	3.5	3.6	2.3	2.2	2.5	3.7	3.7	3.5
Diseases of the heart	14.2	15.2	18.8	23.9	23.2	23.3	8.2	10.1	14.8	18.1	22.1	30.7
1929-31												
Acute rheumatic fever	3.0	2.9	3.1	3.2	2.3	2.3	2.1	2.9	3.3	3.2	2.7	3.2
Diseases of the heart	9.6	10.6	13.4	16.4	18.5	18.4	9.6	10.4	12.9	15.0	21.1	28.2
1939-41												
Acute rheumatic fever	2.1	2.4	2.4	2.6	1.7	1.4	2.9	3.7	3.8	4.2	2.2	2.2
Diseases of the heart	5.5	5.6	8.8	9.2	12.7	11.2	9.3	9.3	11.3	13.2	15.7	21.6
1942												
Acute rheumatic fever	1.8	1.8	1.8	2.1	1.3	1.4	2.6	3.7	3.8	3.6	2.1	1.9
Diseases of the heart	4.3	4.4	6.9	6.9	11.4	10.4	7.5	8.7	12.0	10.9	15.0	19.8
1943												
Acute rheumatic fever	1.6	1.4	1.7	1.9	1.3	1.4	3.3	2.9	2.8	2.6	1.8	2.7
Diseases of the heart	4.0	4.6	7.0	7.7	11.4	9.8	4.8	7.1	11.5	13.5	15.5	23.6
1944												
Acute rheumatic fever	1.7	1.5	2.0	2.1	1.9	1.4	2.9	3.8	3.3	3.8	2.8	1.4
Diseases of the heart	3.9	4.2	7.5	7.1	11.1	8.6	6.3	7.2	11.5	12.7	15.3	18.1
1945												
Acute rheumatic fever	1.6	2.0	1.8	1.8	1.6	1.0	2.3	3.7	2.8	4.1	3.5	2.8
Diseases of the heart	4.0	4.2	6.7	6.6	11.5	7.7	5.5	7.6	9.3	13.4	12.4	13.3
1946												
Acute rheumatic fever	1.1	1.2	1.3	1.8	1.2	1.0	1.9	3.1	3.3	3.5	1.2	2.2
Diseases of the heart	2.6	3.1	5.4	5.9	9.7	6.6	5.2	6.6	9.0	10.7	11.2	15.2
1947												
Acute rheumatic fever	0.9	1.0	1.4	1.2	0.9	0.6	2.8	3.6	3.2	4.1	1.4	1.6
Diseases of the heart	2.2	2.3	4.6	4.7	7.9	6.2	5.2	7.0	7.9	10.0	11.4	14.6

It may be noted here that the Mexicans, who form a relatively high proportion in the Mountain states, are tabulated in the census of 1940 with the white population. This will probably have some bearing on raising the death rates of the white children in this area, while reducing the rate for the nonwhite.

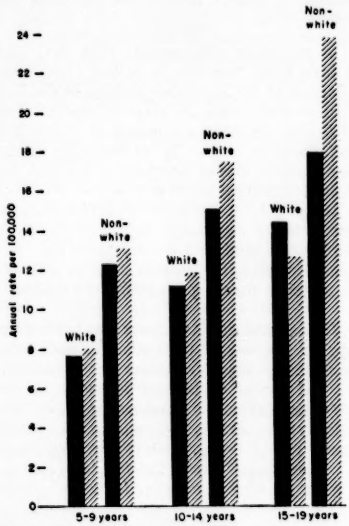
The behavior of the sexes in mortality from rheumatic fever and heart disease is also evident from the chart. There is little significant sex difference for mortality from rheumatic diseases in the total United States except in the age group of the older children, 15 through 19 years. In this age group the nonwhite females show distinctly higher mortality rates than the nonwhite males, while in the white group the rate for females is lower than for males. The sex differences in the nine geographic divisions reveal a similar result. In all nine divisions the white boys, 15 through 19 years of age, have higher death rates than the white girls. In all divisions except Mountain and Pacific, the nonwhite girls exhibit a markedly higher mortality than the nonwhite boys.

The comparison of mortality rates in different geographic regions can be summarized by combining the three age groups and the two sex groups, while taking account of those differences in regional rates which are a reflection of varying proportions of white and nonwhite children. The latter adjustment for the relative weight of race groups in the different regions is necessary in rates for all children (white and nonwhite combined), because the proportions of white and nonwhite children differ greatly from region to region. In table 4 such adjusted regional rates are shown for mortality from acute rheumatic fever and diseases of the heart among all children, together with crude (unadjusted) rates and with rates for white and for nonwhite groups separately. Adjustment for a constant racial composi-

V 14
1951

tion throughout the geographic divisions has been made on the basis of the distribution of white and nonwhite children 5 to 19 years of age, in the total United States, 1940.

Adjusted regional mortality rates for acute rheumatic fever and diseases of the heart, among all children 5 through 19 years of age, range from 8.3 per 100,000



Death rates for acute rheumatic fever plus diseases of the heart among white and nonwhite children by age and sex (black columns, boys; hatched columns, girls) in the United States 1939-1941 (average annual deaths per 100,000 in each specified group).

in the Pacific and 8.4 in the West South Central divisions to 17.4 in the Middle Atlantic group of states. The Pacific and all three southern divisions show lower mortality rates than those for the other divisions (table 4).

The rank order of the Mountain division is doubtful because the adjustment based on population composition in terms of "white" and "nonwhite" is less successful in this division than in the others. In the other divisions, the groupings "white" and "nonwhite" correspond roughly to major groupings according to socioeconomic status, so that adjustment for race tends to equalize such factors also. I quote in this respect from the Census Bureau publication on Vital Statistics Rates in the United States, 1900-1940:

> When deaths are classified by race, there is created also, for example, a hidden classification of economic status to the extent that economic status is correlated with race. An observed difference in mortality between races may in actuality be no more than a difference of mortality for different economic classes.[6]

In the Mountain division, on the other hand, the "white" and "nonwhite" groups do not give as clear a differentiation from a socioeconomic point of view. Children of Mexican origin, who represent a relatively underprivileged portion of the population, are included in the "white" group, and they are found in a larger proportion in the population of the Mountain than of the other divisions. It may be further noted that the nonwhite population in this region is largely American Indians.

Notwithstanding these limitations on statistical control of socioeconomic and racial differences, the progression of relatively low rates in Southern and Pacific divisions to significantly high rates in the Northern and Middle Atlantic divisions points to the role of certain climatic-geographic factors of the natural environment in mortality from rheumatic diseases in childhood. Further studies will be needed to consider how much of what appears to be climatic-geographic difference in mortality may be attributed to differences in degree and character of urbanization or other factors.

RANK ORDER OF STATES

To obtain a rank order of states in childhood mortality from rheumatic heart diseases and to make state to state comparisons more easily possible, the three age groups, the sexes and the two race groups are combined in a single rate for each state in the detailed study of the Children's Bureau.[1] In addition, death rates are shown for the white and the nonwhite children separately. The rank order for all children and the white children alone will necessarily differ because the proportions of white and nonwhite children differ greatly from state to state (from less than 1 to more than 50 per cent). Also the rank numbers for nonwhite children in the states are not directly comparable with those for white children because they refer only to 27 states in which rates for nonwhite children are shown as based

TABLE 4.—*Crude and Adjusted Death Rates for Acute Rheumatic Fever Plus Diseases of the Heart in Children, 5-19 Years of Age, and Separate Rates by Race: United States and Geographic Divisions, 1939-1941*

Average annual rates per 100,000

Geographic Divisions (Ranked According to Crude Rates)	Crude Rate (All Races)	Geographic Divisions (Ranked According to Adjusted Rates)	Adjusted Rate* (All Races)
United States	11.7	United States	11.7
1. Pacific	7.7	1. Pacific	8.3
2. West South Central	8.8	2. West South Central	8.4
3. West North Central	9.3	3. East South Central	9.6
4. East South Central	10.2	4. South Atlantic	9.8
5. New England	10.5	5. West North Central	9.9
6. South Atlantic	11.1	6. New England	12.0
7. East North Central	12.4	7. East North Central	13.3
8. Mountain	15.3	8. Mountain	15.3
9. Middle Atlantic	16.3	9. Middle Atlantic	17.4

(Ranked According to Rates for White Children)	White	(Ranked According to Rates for Nonwhite Children)	Nonwhite
United States	11.1	United States	16.6
1. Pacific	7.4	1. West South Central	12.7
2. West South Central	7.8	2. East South Central	13.1
3. South Atlantic	8.9	3. Mountain	14.2
4. East South Central	9.1	4. Pacific	14.7
5. West North Central	9.1	5. West North Central	16.1
6. New England	10.3	6. South Atlantic	16.4
7. East North Central	11.9	7. East North Central	24.1
8. Mountain	15.4	8. New England	24.9
9. Middle Atlantic	15.6	9. Middle Atlantic	30.5

* Adjusted for constant proportions of white and nonwhite children in the different geographic divisions.

6. Linder, F. E., and Grove, R. D.: Vital Statistics Rates in the United States, 1900-1940, United States Department of Commerce, 1943 (in particular p. 12).

on large enough numbers; but the rank numbers indicate the rank order within these states for the nonwhite group.

The range of the crude rates for mortality from acute rheumatic fever plus diseases of the heart (5 through 19 years of age) was somewhat greater than fourfold (from 5.3 in Vermont to 22.4 in Utah), the average for the United States being 11.7 per 100,000. The median position among the 48 states and the District of Columbia was occupied by Connecticut, with a rate of 10.6. The results for the states confirm, with a few exceptions (Vermont and Maine in New England and Arizona in the Mountain division with low rates; Oregon in the Pacific division and Delaware in the South Atlantic division with relatively high rates), the impression that in general the death rates are lower in the South than in the Northeast, especially than in the Middle Atlantic states, and lower in the Pacific than in the Mountain states. This geographic tendency in the individual states becomes much more distinct if the rates for the white and the nonwhite children are separately ranked, thus taking account of the greatly varying race composition of the individual states.

STATE COMPARISONS WITHIN REGIONS

A few of the more outstanding facts of the detailed report may be mentioned briefly.

In New England, industrial and densely populated Massachusetts shows a distinct tendency toward higher mortality and is closer in this respect to the neighboring Middle Atlantic area than the other states in New England. There are no striking differences among the Middle Atlantic states except that among white children in New Jersey the boys of all age groups have the lowest rates for this whole region while the girls as consistently have the highest. Why white boys should have more favorable rates in New Jersey than in New York or Pennsylvania while white girls have the most unfavorable rates among the three states cannot be answered without further study. In Indiana there is a similar situation. Here the white boys have the lowest rates and the white girls the highest to be found in the five states of the East North Central area (Ohio, Indiana, Illinois, Michigan and Wisconsin).

In the Mountain states the mortality rates for heart disease in Arizona are consistently below the group average; those for Utah are consistently above it. Similar findings have been mentioned by former investigators of the rheumatic fever problem,[7] and they merit a more thorough examination. In particular the high mortality for 15 through 19 year old white boys in Utah, highest among all states, challenges the attention of public health workers and local physicians.

On the Pacific Coast the highest mortality rates for heart disease among white children are found in Oregon and the lowest in California. This cannot be attributed simply to a northern climate, since Washington has better rates than Oregon, nor to overcrowding, since population density is lower in Oregon than in California.

The crude rates used in ranking the states necessarily obscure finer differences by age, race and sex. Therefore, age-specific, race-specific and sex-specific death rates are given in the Children's Bureau monograph also for the individual states; they will provide more detailed information of special interest for the state health authorities.

SUMMARY

1. In the three year period, 1939-1941, 2,538 deaths from acute rheumatic fever and 12,037 deaths from diseases of the heart were counted in the United States in persons under 20 years of age; altogether, 14,575 deaths. Of these, a minimum of 12,000 deaths were of rheumatic origin. In the following years the total annual death toll has decreased to less than 3,000 in 1946 and little above 2,500 in 1948.

2. Mortality from rheumatic fever plus diseases of the heart holds an increasingly high place among fatal diseases in white children 5 to 19 years of age. In the nonwhite population the greatest killer is still tuberculosis, especially for the girls entering the childbearing age.

3. The fact that rheumatic fever plus heart diseases has now become one of the leading causes of death among children is due to a decline in other childhood diseases and not to an increase in rheumatic fever. Mortality from rheumatic diseases among white children has distinctly decreased over the past decades; the downward trend among the nonwhite children is not consistent. The unusual trend for the latter group is probably due to deficient reporting in the early decades of the century.

4. Age, race and sex differences are briefly characterized as follows: There was a distinct rise with age in mortality from rheumatic heart diseases; in each succeeding age group from 5 to 19 years, for both races and both sexes. Death rates were consistently higher for nonwhite children than for white, a fact that suggests that a more unfavorable environment increases the risk of dying from rheumatic heart diseases. Finally, the death rates were somewhat higher among girls than boys. An exception was the much lower rate for white girls 15 through 19 years old, as compared with that for white boys, while nonwhite girls of this age had a markedly higher death rate than nonwhite boys.

5. Study of regional variations showed that the death rates (adjusted for race composition) were below average in the three southern divisions, while in the Northeast, especially in the Middle Atlantic division, they were significantly above average. In the Pacific division the death rates were low and significantly below the country's average, while in the Mountain division they were exceptionally high for white children.

6. When the states are ranked according to death rates for all children 5 through 19 years, the range of the crude rates for mortality from acute rheumatic fever plus diseases of the heart was greater than fourfold. The results for the individual states confirmed in general, with a few exceptions, the findings reported for the geographic divisions.

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7. *(a)* Hedley, O. F.[3] *(b)* Atwater, R. M.: Studies in the Epidemiology of Acute Rheumatic Fever and Related Diseases in the United States Based on Mortality Statistics, Am. J. Hyg. **7**: 343-369, 1927. *(c)* Dauer, C. C.: Mortality Rates of Organic Diseases of the Heart by Geographic Areas in the United States, Am. Heart J. **10**: 955-964, 1935. *(d)* Wedum, B. G.; Wedum, A. G., and Beaghler, A. L.: Prevalence of Rheumatic Heart Disease in Denver School Children, Am. J. Pub. Health **35**: 1271-1276, 1945.

V 14
1951

CERTIFICATION OF MULTIPLE SCLEROSIS AS A CAUSE OF DEATH

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In January 1948, morbidity and mortality studies were initiated to determine the prevalence of multiple sclerosis in the United States and Canada and to investigate the influence of geography, climate, race and other factors on the distribution and outcome of cases of the disease.

In the course of these studies, an error resulting from the use of certain vague terms in reporting causes of death was discovered in the annually published mortality statistics on multiple sclerosis. The purpose of this report is to show how this defect may significantly affect the results of other reported studies on multiple sclerosis and to illustrate the general need for exercise of greater care in stating the causes of death on death certificates Certificates of death are classified by vital statistics offices according to the International List of Causes of Death.[1] Between 1938 and 1948, multiple or disseminated sclerosis was classified in the international list under the title "Disseminated Sclerosis (rubric 87d)." This rubric included a number of "synonyms" for multiple sclerosis, such as "cerebral sclerosis," "general sclerosis" and "brain sclerosis."

The decision to include certain synonyms in a particular category is usually based on the accepted definition of the term. Dorland [2] defines cerebral sclerosis as "multiple sclerosis of the brain," although the same term when qualified by "Merzbacher-Pelizaeus," "Scholz" or "Krabbe" signifies one of the rare cerebral heredofamilial degenerative conditions of children which are not considered synonymous with multiple sclerosis.[2a] However, it has been the experience of the National Office of Vital Statistics that physicians generally use the term cerebral sclerosis in the sense of the cerebral arteriosclerosis, and an attempt was made to query physicians on their use of this and the other synonyms. As it was not practicable to query more than a fraction of the physicians using this term and because not all quires were answered, the majority of reports listing such synonyms were classified in the multiple sclerosis category.

The importance of this error was first noted during a recent survey in Winnipeg, Man., Canada. The average age at death and the contributory causes of death appearing on certificates reporting multiple or disseminated sclerosis were markedly different from those on certificates reporting the synonyms. Also, case reports were obtained from hospitals or physicians for the majority of those persons whose deaths were reported as due to multiple sclerosis or disseminated sclerosis but were lacking for those whose deaths were due to "cerebral" or "general" sclerosis. Consequently, an analysis was made of all death certificates filed in the United States and Canada in 1947 in which multiple sclerosis was assigned as the primary cause of death.

In a review of the official mortality statistics for the United States in 1947, it was found that a total of 1,583 deaths from multiple sclerosis were reported. There were 186 such deaths recorded in Canada by the Dominion Bureau of Statistics. The term multiple sclerosis or disseminated sclerosis was found on 1,299 (82 per cent) of the death reports assigned to the disseminated sclerosis category in the United States. In 271 of those remaining (17 per cent of the total), the term "cerebral sclerosis" was used. On the other 13 reports (1 per cent) the terms "general," "generalized," or "brain" sclerosis denoted causes of death. In this paper, all medical certificates with any of the latter terms are referred to as the cerebral sclerosis category. The percentage distribution of terms on the Canadian certificates was almost the same as that on the United States certificates.

Comparisons of duration of the primary cause, contributory causes of death and age at time of death were made between the deaths reported in the United States in 1947 as due to multiple (or disseminated) sclerosis and those reported as due to cerebral sclerosis. Similar results, although not included in the tables, were found on analysis of the Canadian reports.

TABLE 1.—*Reported Duration of Disease Prior to Deaths Assigned to Multiple Sclerosis Category**

	Deaths Classified as Due to Multiple Sclerosis (87d)			
	Cause Reported as Multiple or Disseminated Sclerosis		Cause Reported as Cerebral Sclerosis	
	Number	Per Cent	Number	Per Cent
Death certificates, no.	1,299	100.0	284	100.0
Those with duration stated.....	722	55.6	80	28.2
Those with duration not stated..	577	44.4	204	71.8
Average duration, yr.	8.4		3.7	

* The statistics are for the United States in 1947.

In the multiple sclerosis group, duration of illness prior to death was reported in 55.6 per cent of the certificates, whereas it was given in only 28.2 per cent in the cerebral sclerosis group. The mean duration in the two groups differs significantly (8.4 years for multiple sclerosis against 3.7 years for cerebral sclerosis).

Prior to 1949, the selection of the cause of death to be tabulated when more than one cause was reported was made by reference to the Manual of Joint Causes of Death. This manual gave the priority relationship between diseases, on the basis of which the primary cause was selected.

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1. Manual of the International List of Causes of Death as Adopted for Use in the United States Based on the Fifth Decennial Revision by the International Commission, Paris, October 3-7, 1938, ed. 4, Washington, D. C., United States Department of Commerce, Bureau of the Census, 1939.

2. Dorland, W. A. N.: American Illustrated Medical Dictionary, ed. 20, W. B. Saunders Company, 1944.

2a. Ford, F. R.: Diseases of the Nervous System in Infancy, Childhood, and Adolescence, Springfield, Ill., Charles C Thomas, Publisher, 1945, pp. 314-318.

In 61.6 per cent of the multiple sclerosis category and in 88.3 per cent of the cerebral sclerosis category, a contributory cause of death was reported. In table 2, the secondary causes in the multiple sclerosis category are arranged in descending order of frequency. It is evident that the contributory causes in the two groups show a different percentage distribution. The secondary causes most commonly occurring in cerebral sclerosis are similar to those generally associated with cerebral arteriosclerosis. Causes that might be expected to occur secondarily to either multiple sclerosis or cerebral arteriosclerosis show only small percentage differences.

It may be seen from table 3 that the mean age at death in the multiple sclerosis category is 53.9, in the cerebral sclerosis category 72.5 and in the arteriosclerosis category 79.0 years. The difference between the average ages at death in the cerebral sclerosis and multiple sclerosis categories indicates that the two are materially different.

The difference between the mean age at death among the members of the groups reported as having cerebral "sclerosis" and "arteriosclerosis" indicates these two groups are not completely alike. Arteriosclerosis, excluding renal and coronary arteries (International List no. 97), includes cerebral arteriosclerosis, generalized arteriosclerosis and sclerosis of arteries other than renal or coronary. Since cerebral arteriosclerosis is not classified separately, the mean age of those dying with cerebral arteriosclerosis is not available.

TABLE 2.—*Nine Most Frequent Causes of Death Secondary to Multiple Sclerosis, Compared with the Causes of Death Reported as Secondary to Cerebral Sclerosis**

	Deaths Reported Due to Multiple or Disseminated Sclerosis		Deaths Reported Due to Cerebral Sclerosis	
	Number	Per Cent	Number	Per Cent
Total	1,299	100.0	284	100.0
Without secondary causes	498	38.3	33	11.6
With secondary causes	801	61.7	251	88.4
All secondary causes	801	100.0	251	100.0
Bronchopneumonia	166	20.7	13	5.2
Myocarditis	133	16.6	20	8.0
Chronic pulmonary congestion	73	9.1	10	4.0
Cerebral hemorrhage, embolism and thrombosis	67	8.4	91	36.2
Diseases of coronary arteries	44	5.5	19	7.6
Pyelitis	35	4.4	1	0.4
Arteriosclerosis (except renal and coronary vessels)	30	3.7	36	14.3
Decubitus ulcers	28	3.5	0	0.0
Unspecified diseases of the respiratory system	22	2.8	0	0.0
All other secondary causes	203	25.3	61	24.3

* The statistics are for the United States in 1947.

One explanation for the difference between the average ages at death in the cerebral sclerosis and arteriosclerosis categories might be that cerebral arteriosclerosis deaths occur at earlier ages than those of the entire group classified as arteriosclerosis. A few of the deaths in the cerebral sclerosis category might be due to multiple sclerosis, but it is also possible that some deaths in the younger age groups were due to heredofamilial degenerative conditions of the brain of children and young adults. The latter would have been included in the cerebral sclerosis category if the eponyms of Merzbacher-Pelizaeus, Scholz or Krabbe had been omitted from the death certificates, and their inclusion, therefore, would have the effect of lowering the average age at death for the entire cerebral sclerosis group.

On the basis of these findings, it appeared that the majority of the cerebral sclerosis deaths should have been coded as arteriosclerosis. Inquiries were then sent to the physicians in the United States from whom 74 reports of cerebral sclerosis deaths had been received by the National Office of Vital Statistics in the first three months of 1947. Unfortunately, none of these queried deaths happened to be in the age groups under 30, and the number of cases in those groups did not attract attention until after the inquiry was completed. In addition, queries were also sent out on 36 cerebral sclerosis death reports received in Winnipeg and in Denver during the period 1939 to 1948. The latter queries were made in conjunction with morbidity surveys in those cities.

TABLE 3.—*Number of Deaths from Multiple Sclerosis and Arteriosclerosis by Age**

Age at Time of Death, Yr.	Deaths Classified as Due to Multiple Sclerosis (87d): Cause Reported as Multiple Sclerosis		Deaths Classified as Due to Multiple Sclerosis (87d): Cause Reported as Cerebral Sclerosis		Deaths Classified as Due to Arteriosclerosis (97)	
	Number	Per Cent	Number	Per Cent	Number	Per Cent†
All ages	1,299	100.0	284	100.0	25,317	100.0
0-14	0	0.0	4	1.4	1	0.0
15-29	82	6.3	5	1.8	7	0.0
30-44	312	24.0	4	1.4	93	0.4
45-59	427	32.9	26	9.2	936	3.7
60-74	361	27.8	102	35.9	6,560	25.9
75-89	114	8.8	131	46.1	15,059	59.5
90 and over	3	0.2	12	4.2	2,647	10.4
Not stated	0	0.0	0	0.0	14	....
Mean age, yr.	53.9		72.5		79.0	
Median age, yr.	54.0		75.0		80.0	

* The data are for the United States in 1947.
† Per cent of those with age stated.

In this query the physicians were asked whether they had used the term cerebral sclerosis in the sense of arteriosclerosis, multiple (disseminated) sclerosis, or in some other way. Replies were received from 101 of the 110 inquiries made. Several of the 9 nonresponses were due to the death of or the inability to locate the physicians. Of the 101 returns, 96 reported the diagnosis as having been arteriosclerosis; three reported "not multiple sclerosis, no additional information"; one reported "not arteriosclerosis, no additional information," and one replied that disseminated sclerosis was meant.

COMMENT

It is clear that the large majority of deaths reported as due to cerebral sclerosis should have been classified as due to arteriosclerosis. Acceptance of cerebral sclerosis reports as multiple sclerosis has introduced a sizable error in the multiple sclerosis category. On the other hand, if cerebral sclerosis deaths had been coded as arteriosclerosis, the relatively few deaths that were not due to arteriosclerosis would have had little influence on the statistics for arteriosclerosis.

V 14
1951

As a result of this study, coding under the latest instructions of the National Office of Vital Statistics [3] requires that cerebral sclerosis be classified as arteriosclerosis.

If mortality data are to be of real value for the study of diseases, it is essential that careful attention be given to the medical certification of causes of death. This is particularly true now that the manner in which the physician certifies the causes of death determines, to a large extent, the cause that will be recorded in the official statistics. It is recommended that approved terms, such as those listed in the "Standard Nomenclature of Diseases," [4] be used in order that ambiguous or inexact terms can be avoided.

This report thus far has been concerned primarily with only one type of error in mortality statistics, that arising from the use of ambiguous medical terms. Other errors in cause of death statistics may result from inaccuracies or misstatements in diagnoses, defects in the disease classification system and clerical errors. Defects in disease classification can be rectified through periodic revision of the classification used, and clerical errors can be controlled by a strict verification procedure. The more basic—and also the more elusive—kinds of error are those arising from what the medical attendant certifies as the cause of death.

Influence of Diagnostic Errors.—The accuracy of the physician's diagnosis depends on the clarity of the clinical picture, the diagnostic facilities available to him and his diagnostic acumen. Rare conditions are probably more frequently misdiagnosed, especially where facilities and consultant specialists are limited. As medical facilities and training improve, the accuracy of diagnosis will continue to increase. The ever rising "diagnostic level" may be one of the reasons for the impression that many of the formerly "rare" diseases are becoming commoner.

The reliability of a diagnosis of multiple sclerosis is not known, but an indication of the problem may be seen from a study [5] made of the clinical-pathological statements of causes of death based on data from 15 metropolitan hospitals during the period 1930-1939. In this study of about 25,000 deaths for which clinical and autopsy results were available, there were 33 deaths in which a clinical diagnosis of disseminated sclerosis was made. Of these, 10 were found at autopsy to be due to other diseases. On the other hand, there were 11 cases in which the original clinical diagnosis was not disseminated sclerosis but the disease was so diagnosed at autopsy. As a result of these compensating errors, the number of deaths attributed to disseminated sclerosis on the basis of clinical diagnoses agreed almost exactly with the number found on the basis of the pathological diagnoses. Although the totals may agree, it is unlikely that the compensating errors are such that close agreement will be obtained with regard to such population characteristics as age, race and sex.

In many cases, the cause of death may be obscure, not because the condition is rare or difficult to diagnose but because the physician did not have sufficient opportunity to work up the case. In the event that the physician was able to see the patient but once or twice, or not at all, prior to death, the cause of death as certified cannot be much more than a considered guess.

Influence of Reporting Errors.—The vital statistics offices are working constantly to improve the quality of cause of death statistics by careful interpretation of the physician's reports and by seeking additional information where needed. In the end, however, much of the responsibility for improving this part of the research armamentarium rests with the physician himself.

Errors sometimes arise from carelessness in reporting, or from the misstatement of a known diagnosis to protect the family of the deceased from stigmas supposedly attached to certain diseases or to aid the survivors in securing certain death benefits. Also, the fact that vital statistics offices formerly followed a somewhat rigid practice of querying unapproved medical terms or incomplete returns undoubtedly encouraged the reporting of erroneous but acceptable diagnoses. While the use of ill defined medical terminology is to be deprecated, vital statistics offices are now recognizing that the exact cause of death cannot always be determined and that more accurate statistics are provided when statements such as "cause unknown" are accepted without further question.

Influence of Classification Revisions.—Changes in classification, such as those effected every 10 years by the International Revision Conferences, are made to improve the recording and interpretation of mortality data. However, such changes may result in a break in the continuity of a comparable statistical series for certain causes of death. As a result of the latest revision,[6] the physician's judgment, as indicated by the order of the diseases given on the medical certificate form rather than a somewhat static coding system, will be used in determining the underlying cause of death.

In a special study of the 1940 death certificates, 1,466 certificates in which multiple sclerosis or one of its synonyms was reported were analyzed. Of these, 1,240 had been assigned to the disseminated sclerosis category, and the remaining 226 (15.4 per cent) were assigned to the associated cause. Although the figures for a similar analysis are not available for the years 1941 to 1948, it is likely that the percentage of deaths in which multiple sclerosis was coded as the associated and not the primary cause of death was about the same as in 1940. Now that the physician's judgment determines the underlying cause of death, it is possible that some or all of the deaths in which multiple sclerosis would have been coded as the associated cause, according to the past classification system, will now be considered as deaths in which multiple sclerosis is the primary cause. As it

3. Vital Statistics Instruction Manual: II. Cause-of-Death Coding, 1950, Washington, D. C., National Office of Vital Statistics, Federal Security Agency, 1950.

4. Jordan, E. P.: Standard Nomenclature of Disease and Standard Nomenclature of Operations, Chicago, American Medical Association, 1942.

5. Statistics of Clinical and Pathological Statements on Causes of Death, Health and Statistics, Statistical Bulletin, vol. 2, nos. 4 and 5, Battle Creek, Mich, W. K. Kellogg Foundation, 1942.

6. Dunn, H. L.: The Doctor and the New International List of Diseases and Causes of Death, J. A. M. A. **140**: 520-522 (June 11) 1949.

is possible that the reverse may be true also, the proportion of deaths with multiple sclerosis as a primary cause to the total multiple sclerosis deaths cannot be predicted. Although the total number of deaths attributed to multiple sclerosis may drop about 18 per cent, as cerebral sclerosis will no longer be included in this group, the influence of coding revisions may counteract in part the expected drop in multiple sclerosis mortality. A study is now in progress to determine the influence that will result from the coding revisions on the mortality tabulations for all causes.

SUMMARY

According to this analysis, it is estimated that multiple sclerosis as a cause of death was overstated by about 18 per cent in the official mortality statistics for the United States and Canada in 1947. This error resulted from the recording of such reported causes of death as "cerebral sclerosis" and "general sclerosis" in the multiple sclerosis category. Although cerebral sclerosis is defined as multiple sclerosis of the brain, the term is almost invariably used in the United States and Canada to mean arteriosclerosis of the brain. Duration of the disease prior to death, secondary causes of death and age distribution of the decedents for those deaths reported as due to cerebral sclerosis differed significantly from those reported as due to multiple sclerosis.

Vague and ill defined terms will be queried, as in the past, by vital statistics offices. As a result of this study, terms such as "cerebral sclerosis" and "general sclerosis" will be queried in the United States but will be provisionally assigned to arteriosclerosis rather than to multiple sclerosis, unless otherwise indicated.

In the comparison of the annual multiple sclerosis mortality statistics for the United States, it should be kept in mind that "cerebral sclerosis" deaths have made up approximately 18 per cent of the total deaths recorded in the disseminated or multiple sclerosis category prior to 1949. International comparison of multiple sclerosis data will also be affected, unless such terms as "cerebral sclerosis" are used and interpreted in the same way in different countries.

After 1948, multiple sclerosis mortality statistics will reflect more accurately the multiple sclerosis mortality problem in the United States. Reports of "cerebral sclerosis" and "general sclerosis" will be classified in the manner that they are used, and the new cause of death classification procedures will rely on the physician to indicate the main cause to be tabulated for the official statistics. This means that the certifying physician will need to exercise greater care in reporting causes of death on the death certificate so that the underlying cause of death is clearly stated.

Despite the defects, mortality statistics serve a useful purpose in the study of disease, particularly in the absence of morbidity statistics. The physician is in a position to contribute greatly to the improvement of such statistics by providing more complete and accurate information concerning causes of death. In turn, he may profit from the statistics on various aspects of causes of death, which are made available to him from vital statistics sources.

COUNCIL ON PHARMACY AND CHEMISTRY

The Council has authorized publication of the following report of the Committee on Pesticides.

R. T. STORMONT, M.D., *Secretary.*

The following article is the second in a series on aspects of pesticides of immediate medical interest. The Committee wishes to acknowledge the assistance of Drs. Kenneth P. DuBois, Francis F. Heyroth, Harold C. Hodge and Wayland J. Hayes Jr., in reviewing the manuscipt, and contributions of records of poisoning by the Commissioners of Health of Columbus, Ohio; Detroit; Houston, Texas; Minneapolis; New York and San Juan, Puerto Rico, and the Chief, Bureau of Adult Health, California Department of Health.

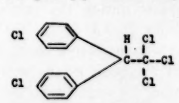
BERNARD E. CONLEY, *Secretary,*
Committee on Pesticides.

PHARMACOLOGIC AND TOXICOLOGIC ASPECTS OF DDT (CHLOROPHENOTHANE U. S. P.)

DDT is the abbreviated name for the various mixtures of para, para prime (*p,p'*) and ortho, para prime (*o,p'*) isomers of dichlorodiphenyltrichloroethane which are used for insecticidal and medicinal purposes. DDT was first prepared by a German graduate student, Zeidler, in 1874, but its pesticidal value was not discovered until 1936 nearly seventy years later. During extensive studies on mothproofing agents in 1936-7, the effects of DDT on certain common agricultural and household insects were noted and reported by Müller, a Swiss chemist. In 1942 entomologic tests were made in the United States with results so promising that they led the Armed Services to adopt a DDT louse powder in the following year. Further developmental studies were conducted during the war; the results are finding wide application in agriculture, medicine, public health and commercial sanitation. The importance of DDT to public health received universal recognition in 1948 through the award of the Nobel Prize in medicine to Paul Müller who discovered its entomologic properties.

PROPERTIES

There are forty-five possible isomers of dichlorodiphenyltrichloroethane, the *p,p'* isomer being the most active form as an insecticide. Chemically pure *p,p'* isomer is an odorless, tasteless, crystalline substance which occurs in long white needles. It is relatively inert and generally stable. The structural formula of the pure *p,p'* isomer may be represented as follows:



1,1,1-trichloro-2,2-bis(*p*-chlorophenyl) ethane.

Three grades of DDT are recognized: the technical or commercial grade, with a setting point of 88 C.; purified or aerosol DDT, a partially refined grade with a melting point of 103 C. and pure DDT, a highly purified grade of the *p,p'* isomer with a melting point of 108.5 to 109 C. which is used as a reference standard in certain physiologic and pharmacologic studies.

Technical DDT is a soft, cream to grey powder with a fruit-like odor. All grades of DDT are insoluble in water, but moderately soluble in mineral and vegetable oils and readily soluble in most common organic solvents. DDT alone is not employed in insect control. For insecticidal use it is prepared as (1) oil solutions in petroleum or other suitable organic solvents; (2) emulsion concentrates which are diluted with water for use; (3) powders, incorporated into suitable, dry carriers for application as a dust, or modified by the addition of wetting agents into a wettable powder which is mixed

V 14
1951

with water for use as a spray; (4) aerosols in suitable oils for dispersion, as mist or smoke, by means of heat, mechanical methods or by gas under pressure; and (5) coverings included in paints, polishes or waxes. The form of preparation depends on the type of use, the coverage desired, the pest and the area or location where control is desired. DDT insecticides are marketed under many trade names and by various manufacturers and distributors. The concentrations used vary from 1 to 75 per cent.

As an insecticide, DDT is used both as a contact and stomach poison. The preparation is not a fumigant or repellent, nor does it have ovicidal properties. It acts primarily on the nervous system of the insect. Because its action is slower than that of many other chemicals, it lacks rapid paralyzing effects. However, the facts that small amounts are required and that its action is prolonged increase its value. As is the case with most organic chemicals, the effectiveness of DDT varies with the insect. Although highly toxic to many species and groups of species, DDT is so slightly toxic to other closely related species as to be ineffective in their control. Some species, notably houseflies and certain mosquitoes, have developed a tolerance or resistance to DDT. The factors which produce and influence this resistance are not fully understood but do not appear to be associated with any detectable morphological modifications.

USES

A wide variety of insects of economic and public health importance respond to DDT. The agent has been used extensively in the control of many plant pests, including species attacking fruit, shade and forest trees, ornamentals, vegetables and field and grain crops. DDT must be applied cautiously to food crops, which require treatment after the development of the edible portion of the plant, if residues at the time of harvest are to be avoided. Crops which are not intended for food or fodder or whose edible tubers are produced below ground can be treated without regard for residue contamination.

DDT has been widely used also in the control of many pests of livestock and other domesticated animals. It should not be used on dairy cattle or animals being prepared for slaughter since there is a danger of accumulation of the substance in the milk and tissues of treated animals.

The use of DDT larvicides, dusts and residual sprays against disease-carrying species of mosquitoes, ticks, fleas and lice, and filth and nuisance insects such as flies, roaches, bedbugs and beetles has been equally successful and provides a valuable adjunct to established epidemiologic practices in the management of these pests.

In therapeutics, DDT is used as a pediculicide and in conjunction with benzyl benzoate and ethylaminobenzoate as a pediculicide and scabicide. A mixture of these compounds has been accepted for inclusion in New and Nonofficial Remedies for the treatment of scabies and pediculosis. DDT is official in the United States Pharmacopoeia, 14th Revision under the name Chlorophenothane.

PHARMACOLOGY

DDT is a "cerebrospinal" poison which acts primarily on the central nervous system in man and higher animals as contrasted with its apparent peripheral action in insects. The principal systemic effects in higher animals are disturbances of the central nervous system characterized by hyperexcitability, generalized tremors, spastic or flaccid paralysis and convulsions.

The cerebellum and the higher motor cortex appear to be the chief sites of action. Activity on the spinal cord, myoneural junctions or muscles has not been demonstrated. It has been postulated that the alteration in cerebellar activity is due to the excitation of its afferent pathways. There does not appear to be direct involvement of any enzyme system in warmblooded animals, although increase in metabolic rate during DDT poisoning has been noted in animal studies. The increased metabolic rate is reflected in increased food and water intake and decreased body weight.

DDT also sensitizes the myocardium to the extent that ventricular fibrillation may be induced by sympathetic stimulation either of extrinsic origin, such as intravenous administration of epinephrine, or from an intrinsic source (sympathin) resulting from sympathetic hyperactivity. It is believed that the production of sympathetic discharges is due to hypothalamic stimulation which, combined with myocardial sensitization, produces ventricular fibrillation.

The toxic manifestations of DDT are thought to be due to the presence of the trichloroethane group, and to the *p*-chlorophenyl radicals resulting from the replacement of the hydrogen in the para positions of the benzene rings by a halogen atom. It has been postulated that DDT exerts a physical rather than a chemical action through interference at the lipid surface of the nerve; i. e., it physically interferes with recalcification at the surface of the nerve by disordering the surface structure of the axon. The action is exerted by DDT itself and not by a more toxic intermediate metabolite.

Metabolism.—Absorbability is thought to be the principal factor which differentiates the toxicity of DDT in insects from that in man. Under certain circumstances DDT is absorbed through the gastrointestinal tract, respiratory tract and through the skin. This is not true of DDT in solid form, which is poorly and irregularly absorbed from the gastrointestinal tract and practically unabsorbed from the skin. Retention in the respiratory tract depends largerly on the size of the particle; those of such size that readily penetrate the alveoli and are retained may be absorbed depending on the accompanying solvent. Absorption from the gastrointestinal tract and skin is influenced also by the solvent used. Lipoid solvents and the presence of fat in the intestines favor absorption. The preponderance of available evidence indicates that most animals do not absorb much or any DDT from the skin unless the compound is in oily solution. In certain experiments, however, when DDT was applied as wettable powders to dairy cows, it appeared in body fat and milk, indicating absorption through the skin. If this interpretation is substantiated by re-evaluation of the experiments in terms of the DDT content of the food which the cows ate, it may be concluded that dairy cows constitute an exception to the rule.

The excretion of DDT is slow and incomplete. A large portion of DDT administered by mouth is excreted unchanged in the feces, indicating incomplete absorption of the compound. A part of the DDT absorbed into the body appears in the urine within two to four days as di-(*p*-chlorophenyl) acetic acid or "DDA" (75 to 80 per cent) and as neutral compounds (esters of DDA). Some of the remaining absorbed fraction is excreted in the bile in an undetermined form. The remaining unchanged DDT is stored throughout the body in fat depots from which it is gradually released, significant amounts appearing in the milk of lactating animals.

DDT is partly decomposed in the liver to nontoxic metabolites which are excreted at irregular rates. After a single dose degradation products may persist in the urine for two weeks or more. In acute poisoning they reach a peak in several days and small amounts may persist for several weeks. During prolonged administration the amount eliminated in the urine increases progressively until a plateau is reached and maintained.

Distribution.—DDT is found in all tissues; because it is more soluble in fat, the greatest amounts are evenly distributed among the fat depots of the body. It has also been found in the blood and bile in both acute and chronic poisoning and in the liver, spleen, kidneys, adrenals and brain. The storage of DDT in animal tissue, especially fatty tissue, has been demonstrated in cows, dogs, monkeys, rabbits, rats and poultry. Little is known about DDT storage in vegetable (plant) fats. The quantities stored in animal tissue apparently depend on both the level of intake and the length of time over which intake occurs. This may be 6 to 28 times the level of dietary intake. With low dosage levels (1 to 10 parts per million [p.p.m.]), a maximum storage level is reached in six months; with higher dosage levels there is a continual storage of DDT. An animal may accumulate amounts equivalent to several intravenous lethal doses without showing any obvious signs of poisoning. Accumulation occurs at every level of intake. Fifty per cent of the DDT stored is known to be retained after three months. It has been found that the animal body does not distinguish between the *p,p'* and *o,p'*-isomers but accumulates them in the proportions in which they occur in the diet.

Susceptibility.—Wide individual variations in susceptibility to poisoning occur with various animal species. These variations are independent of the route of administration and the solvent or suspending medium used; they may be due to differences in amount of body fat, absorptive ability, nutritional state and diet. Animals with large amounts of body fat are less susceptible to acute poisoning than animals which lack such deposits; fasted animals are more susceptible than animals on an adequate diet, and young animals are usually more susceptible than older ones. Susceptibility generally decreases with increase in the complexity of the living organism. Fish are probably as sensitive as insects, followed by crustaceans, amphibians and small animals. Among the mammals, susceptibility decreases in roughly the following order: mice, rats, cats, dogs, monkeys, swine, sheep and goats. Birds are especially resistant to the chemical.

TOXICOLOGY

Although DDT is an inherently toxic material, it has a wide margin of safety when judiciously used because mammals absorb relatively little of it. Acute poisoning from the absorption of crystalline DDT either through the skin or through the respiratory tract is unlikely, and large oral doses of the undissolved chemical must be ingested to produce symptoms of acute intoxication. DDT in lipoid solvents has a greater tendency to be absorbed from the skin and the gastrointestinal tract and is therefore dangerous. The intrinsic toxicity of DDT is about the same for insects and mammals.

The lethal dose for DDT varies widely with species, individuals within a species and with the mode of administration and the vehicle used. The rate and extent of absorption through body surfaces largely determines the toxic and lethal doses for a given species. For example, the intravenous dose of DDT is approximately 1/10 the oral lethal dose and symptoms of intoxication are evident within five to ten minutes in contrast to the latent period of several hours which follows oral administration. Death or complete recovery from single toxic intravenous doses follows in less than 24 hours. The minimum lethal dose by the intravenous route is about 50 mg./Kg. for most species in contrast to the wide range of oral doses lethal to the several species of animals which have been studied. The median lethal dose by the latter route ranges (in terms of mg./Kg. of body weight) from, 150-250 for mice and rats, 150-300 for cats and dogs, 300-500 for guinea pigs and rabbits, to over 200 for monkeys, over 300 for cows and horses, about 1,000 for sheep and oats, and over 1,300 for chickens. The toxic intraperitoneal dose is much greater than the intravenous one because DDT is not readily absorbed from the peritoneal cavity. When given subcutaneously or intramuscularly, DDT is poorly and irregularly absorbed, subcutaneous deposits of the compound lasting for as long as 40 days.

Although DDT is toxic to all higher animals, it has considerably less acute toxicity than some of the older insecticides such as the arsenicals, nicotine, sodium fluoride and paris green. Following are the median lethal doses of some commonly used insecticides for the rabbit: DDT (300-500), sodium fluoride (200), basic lead arsenate (180), sodium fluorosilicate (120), acid lead arsenate (100) and arsenic trioxide (15-30).

The chronic effects of DDT are similar to those of other halogenated compounds. Chronic poisoning may result from prolonged ingestion or exposure to small amounts of DDT. The persistence of these effects depends on the size of the dose and the period of exposure. As in acute poisoning, there are wide individual variations in susceptibility regardless of the route of administration; this makes it difficult to establish safe tolerance levels applicable to all individuals.

Oral Toxicity.—The fatal oral dose of DDT is not known, although one report of a fatality by this route of administration indicates that it may be about 500 mg./Kg. for man. This represents about an ounce of the solid material for the average person. Ingestion of massive amounts of powdered formulations of the chemical produces acute poisoning in spite of the fact that much of the material may be removed by vomiting. Exact determination of the acute oral toxic or lethal dose is difficult because the degree of gastrointestinal absorption of the material depends on the presence of fat or solvent. A number of deaths attributed to acute DDT intoxication have been reported in medical periodicals, but all cases were complicated by the concurrent ingestion of large quantities of solvents which are capable of producing similar toxic effects.

Chronic DDT poisoning may result from the ingestion of small amounts of the material over a long time. Since the chemical is irregularly absorbed, the level below which adverse long range effects are absent is unknown. The Federal Food and Drug Administration has tentatively set a tolerance of 5 p.p.m. as the upper limit on any single item containing DDT residues for human consumption and less than 1 p.p.m. if all the food consumed is contaminated.

Cutaneous Toxicity.—Powdered DDT rarely is toxic or irritating to the intact skin, and it does not appear to retard the healing process when contaminating cuts or abrasions. It is not absorbed in this way, unless agents which facilitate absorption are present on the skin. An oily layer of sebum on the skin or the presence of greasy solvents on the integument increases absorption of DDT, and might constitute a danger if these circumstances of exposure were frequently repeated. A small, predictable incidence of cutaneous sensitivity from powdered DDT may be expected. Some contaminating compounds in technical grade DDT are known to be capable of producing cutaneous sensitivity and these contaminants rather than DDT itself, may be responsible for the induced sensitivity which has been reported. The fact that DDT has been used extensively in both agriculture and industry indicates that the possibility of cutaneous reactions from the powdered form of the technical chemical is fairly remote.

DDT is not considered harmful to the eye, since ointments and solutions up to 5 per cent have been used without ill effects. DDT powder splashed into the eye has been reported to cause intense pain, temporary blindness and headaches for a fortnight. These effects presumably were due to mechanical irritation. Powdered DDT is no more irritating than other fine crystalline material.

DDT solution is poisonous. On the basis of data, from studies on animals the amounts estimated to be toxic to normal adults on single and frequently spaced multiple exposures are 169 Gm. and 9 Gm. per day, respectively. In oil or organic solvents DDT is readily absorbed through the skin, producing systemic effects. Moderate transient contact with DDT solutions of a low concentration (5 per cent and under) is not dangerous, but prolonged, heavy exposure should be avoided. The chief hazard lies in handling concentrated solutions (10 per cent-25 per cent).

Certain solvents and other additives incorporated into DDT formulations are capable of producing irritation of the skin and mucous membranes. Prolonged or heavy exposure to petroleum distillates causes irritation and may produce systemic effects which vary with the individual solvents. These differ in propensity to produce primary skin irritation or systemic toxicity depending on their fat solvent properties and the circumstances of their use. For example, chlorinated solvents are more readily absorbed through the skin than those free of halogen and they are inclined to potentiate any hepatotoxic effects of DDT which may be present. Likewise, organic solvents have greater irritating effects in warm weather than cooler conditions. In addition, accidental contamination of the eyes may be dangerous because of the irritant properties of pyrethrins and primary solvents used in many DDT formulations. Petroleum distillates possess primary irritant action and photosensitizing properties depending on the degree of refinement of the fraction used. The sensitizing action is manifested by an unpleasant prickling sensation a few minutes after exposure to sunlight, followed by an erythematous reaction. Pigmenation later develops at the site of the most intense reaction. The element which produces this photosensitizing phenomenon is unknown, although it is apparently associated with the tarry residue of less refined types of solvents.

Inhalation Toxicity.—The inhalation of DDT powder offers little hazard because of the large particle size and the relative insolubility of the compound. Certain supposedly inert diluents used in the formulation of DDT wettable powders

V 14
1951

may irritate the bronchi, producing a persistent cough. Consequently, large scale dusting operations, or exposure to confined conditions where the dust does not move freely on air currents away from the field of operation, demand the use of respirators. Exposure to chloral hydrate or chlorobenzene used in the manufacture of DDT may also produce untoward effects unless proper precautions are taken.

DDT emulsions and certain oil solutions may be readily absorbed by the lungs on inhalation. The concentration of DDT in the atmosphere (12-50 mg./liter air) from the use of the standard DDT aerosol (3 per cent DDT) will not produce symptoms of DDT poisoning even with frequent application because appreciable concentrations of the insecticide do not stay long in the atmosphere. DDT rapidly settles out of the air when released as an aerosol, smoke or spray, and it firmly adheres to any surface with which it comes in contact, thereby reducing the dust hazard. The Food and Drug Administration estimates that the aerosol form of DDT would be safe in concentrations of several hundred times those which occur in the atmosphere.

Sufficient concentrations of solvents used in DDT aerosols and sprays can cause irritation of the mucous surfaces of the eye and respiratory tract, and may produce intoxication. Under the circumstances of ordinary use, however, little hazard exists because of the transient nature of the exposure. Isolated cases of poisoning by this route have been reported but they are believed to be due to an uncommon sensitivity on the part of the individual to DDT or other ingredients of the formulation.

Pathology.—Pathologic studies of DDT poisoning are few and the morphologic changes to be expected must be deduced from animal experiments. Pathologic changes that occur in experimental animals which have received DDT vary with the dose. In acute fatal poisonings significant pathologic changes are not likely, although mild to moderate damage to the liver and kidneys may be observed. Fatty degeneration of the myocardium, occasional hemorrhages in the adrenals and terminal pulmonary edema have been observed by British investigators, although American workers do not consider the latter condition to be characteristic of DDT poisoning. Significant pathologic alterations of the brain and spinal cord have not been observed in acute cases. In more prolonged exposures, the pathologic changes observed are: centrolobular necrosis of the liver, fatty degeneration of the tubular epithelium of the kidneys, focal necrosis of the cardiac and voluntary muscles and central nervous system changes, involving vacuolization around the large nerve cells in the spinal cord and cerebral motor nuclei, and lesions in the roof and dentate nuclei of the cerebellum. In addition, non-specific effects resulting from inanition may occur, such as atrophy of the various organs and general emaciation. Central nervous system changes occurred only when relatively large doses are given over a prolonged period of time. These changes are slowly progressive and probably irreparable. Visceral changes, especially those involving the liver, have been noted, even with small frequently administered doses. They are usually reversible with proper therapy. Degenerative changes and necrosis in the kidney frequently were found, although damage was less severe than that which occurred in the liver. The individual isomers, *p,p'* and *o,p'*, as well as the technical grade DDT are capable of producing the foregoing pathologic findings. Prolonged administration of amounts as small as 10 p.p.m. elicits detectable pathologic change. At levels of 10 mg./Kg. or lower these changes have been noted only in rats, in which case statistical evaluation is required to differentiate them from variations found in the livers of normal rats.

Symptoms.—Gross symptoms may be observed in acute DDT poisoning, the severity of which depends on both the dose of DDT and the formulation involved. Twitching of the eyelids is an early sign which progresses until severe generalized tremors become apparent. The tremors are coarse; beginning in the muscles of the head and neck, then progress caudally to involve the entire musculature with increasing intensity. They are particularly severe in the extremities. The convulsive seizures are similar to those encountered in strychnine poisoning being elicited by irritation and mechanical stimuli such as sudden noises and jarring. Death usually results from respiratory failure, although heart failure induced by ventricular fibrillation may intervene in predisposed individuals. The pattern is similar for most species of animals. Pulmonary edema, which was the cause of death in a number of alleged DDT poisonings, is common to solvent poisoning and is not characteristic of DDT.

Chronic intoxication may be manifested by loss of weight, anorexia, mild anemia, muscular weakness and tremors that terminate in convulsive seizures, coma and death. Polymorphonuclear cytosis, thought to be primarily attributable to solvent intoxication, may also be observed. The presence of such impurities as chlorobenzene in technical DDT may also account for the occasional report of blood abnormalities. Premonitary signs in the form of anorexia, nervous manifestations and muscular weakness warn of the approach of toxic levels in animals, and tremors may be the earliest sign of intoxication.

Diagnosis of DDT poisoning should be based on a record of exposure and the presence of characteristic neurologic manifestations. Certain clinical laboratory procedures may be useful in confirming the initial diagnosis. Urinalysis involving colorimetric or total organic chlorine determinations are of value in suspected cases of DDT poisoning. The presence of DDT can be detected by this method but the amount ingested cannot, since degradation products of DDT are not excreted at a uniform rate. Liver function tests such as icterus index, quantitative bilirubin, thymol turbidity and prothrombin time, in conjunction with vitamin K tolerance, may be useful for the measurement of possible liver damage due to prolonged exposure to DDT. Hematologic examinations employing siderocyte levels, hemoglobin and red cell estimations, reticulocyte and leukocyte counts have also been suggested. Total and differential white cell count may be useful in early diagnosis of poisoning since neutrophil leucocytosis and slight anemia have been reported as early signs; however, abnormal blood findings are usually found only in terminal stages of poisoning. Hematologic examinations are not believed to be of great diagnostic value because blood changes after exposure to chlorinated hydrocarbons are frequently difficult to evaluate. Many times solvents are present which may also contribute to the abnormal appearances in blood.

Solvents used in the formulation of DDT preparations, particularly kerosene, often produce symptoms which simulate those of acute DDT poisoning. Nervousness, jitters, loss of equilibrium, nausea and vomiting are among the symptoms which solvents have in common with DDT. Headache, fatigue, numbness and tingling sensations of the lips are characteristic of solvent poisoning. The signs of solvent intoxication set in promptly, in contrast to the latent period of several hours required for the development of DDT symptoms; consequently this characteristic can be of considerable value in the final diagnosis.

Treatment.—The treatment of acute DDT poisoning is directed towards removing DDT from the alimentary tract and allaying neurological manifestations. If DDT is ingested, it should be removed by gastric lavage followed by a saline cathartic. Materials which promote absorption, such as oil cathartics or fats in the diet, are to be avoided. If tremors or other nervous symptoms develop, phenobarbital should be administered in doses sufficient to control them. The selective depressant action of phenobarbital on the motor cortex makes it superior to other barbiturates for this purpose. Finally, external stimuli such as sudden noises or jarring, or the administration of epinephrine which might induce a fatal ventricular fibrillation should be avoided. When chronic poisoning is suspected, symptomatic therapeutic measures which are employed for hepatotoxic substances may be instituted if indicated by liver function tests.

Under the circumstances of ordinary use DDT is not likely to be harmful; however, certain precautions must be observed to guard against its potential toxic properties and those of the constituents commonly found in DDT formulations. The precautions are:

A. *Occupational Precautions.*—1. DDT Dusts and Powders: Persons exposed to large amounts of DDT dusts and powders under confined conditions or where dust particles are not carried away by free movement of air currents should wear respirators. Such conditions might be encountered in mass delousing procedures, larviciding with dusts, and manufacturing or formulating operations. Protective clothing should be worn when there is a possibility of greases and oils contaminating the skin, thereby enhancing the absorption of DDT dusts or powders.

2. DDT Emulsions and Solutions in Oil and Organic Solvents: Frequent or prolonged exposure to emulsions or solutions of DDT in petroleum oils and organic solvents should be avoided unless protective clothing, goggles and neoprene or solvent-resistant gloves are worn. Clothes must be changed promptly if concentrates (10 per cent-25 per cent or more) are spilled on them. A contaminated skin area which has come in contact with DDT soaked clothing or spilled DDT concentrates should be washed immediately with soap and water. Concentrates should be mixed in well ventilated rooms and fire precautions observed when volatile and inflammable solvents are present.

3. DDT Sprays, Mists and Aerosols: Operators involved in large scale spraying or fogging with solutions of 5 per cent or more of DDT should wear respirators and other protective devices. Smoking is to be avoided during spraying when combustible mixtures are used. Greaseless skin lotions should be used on exposed body surfaces when irritant solvents are present in the formulation. Clothes should be changed and the body cleansed after each day's operation.

B. *Household Precautions.*—DDT is a highly effective and useful insecticide and it is not likely to cause poisoning unless carelessly used. DDT insecticides should never be stored in food cupboards or medicine chests where there is likelihood of contamination or mistaken use. All exposed foods, utensils and working areas must be covered when kitchen and dining areas are being sprayed. Children's toys or cribs and rooms occupied by sick people should not be sprayed. Use of oil solutions on household pets should be avoided and DDT powders should be used only where they cannot be licked off. Intimate skin contact with aerosol discharge is to be avoided. Plants and aquariums in the home should be removed or covered before applying DDT sprays or aerosols. The use of oil solutions in the vicinity of open fires should be avoided because of the inflammability of such mixtures.

CLINICAL EXPERIENCE

A large number of cases of poisoning allegedly due to DDT and its formulations have been reported. Lack of precise data on many of these intoxications has prevented the evaluation of single cases or the development of accurate statistics. The Committee on Pesticides tabulated and reviewed cases recorded in the available medical periodicals or on file with the health departments of the various states and large municipalities. The results of this study are summarized in the table.

DDT may be prepared in solvents whose toxic manifestations mimic those of the principal insecticidal ingredient. For this reason the attending physician may be unable to ascertain which material is the primary toxicant and to what degree the other ingredients influenced the toxicity of the complete preparation. From the point of view of the ultimate outcome, however, which ingredient was responsible is insignificant. The selection of cases for this report, therefore, included all except those which presented evidence of disease attributable to sources other than chemical poisoning.

*Reported Cases of Poisoning Due to DDT and Its Formulations**

	Powder						Solution						Other Unspecified Formulations						Grand Total
	Dermatitis	Conjunctivitis	Hypersensitivity	Systemic Tox.	Fatality	Total	Dermatitis	Conjunctivitis	Hypersensitivity	Systemic Tox.	Fatality	Total	Dermatitis	Conjunctivitis	Hypersensitivity	Systemic Tox.	Fatality	Total	
Agricultural																			
Field work	..	1	..	..	..	1	9	..	1	3	..	13	2	1	..	1	1	5	19
Extermination	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	1
Fruit picking	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	1
Horticultural	1	..	..	..	..	1	..	..	..	..	..	..	2	..	..	..	..	2	3
Other	..	1	..	1	..	2	28	..	..	12	..	40	..	..	..	..	..	..	42
Industrial																			
Manufacturing	..	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..	6	6
Laboratory	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	1
Food processing	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	1	..	1	2
Other	..	..	..	..	..	..	..	..	1	..	1	2	..	2	..	..	..	2	4
Miscellaneous																			
Household use	..	..	..	..	..	..	5	..	1	9	..	15	..	..	1	2	..	3	18
Garden use	..	..	..	..	..	..	2	..	..	..	..	2	..	..	..	..	..	..	2
Accidental ingestion	..	..	..	229	..	229	..	..	..	15	5	20	..	..	..	10	4	4	263
Intentional ingestion	..	..	..	1	1	2	..	..	..	5	1	6	..	..	..	13	1	14	22
																		Grand Total	384

* The selection of cases for this tabulation included all except those which presented evidence of disease attributable to sources other than chemical poisoning.

REPORT OF CASES

The following cases are representative of the several types of poisoning:

CASE 1.—A woman, aged 32, despondent since the death of her son, was found lying on her bed. The victim informed a relative that she had taken a 10 per cent DDT roach powder. She was taken to the hospital but available data did not provide information on the type of treatment employed. The woman died 13 hours later. Postmortem examination revealed 1.8 mg. DDT per 100 Gm. liver, 4.2 mg. DDT per 100 Gm. stomach, moderate congestion of the lungs and severe congestion of the gastric mucosa in the region of the cardiac antrum. Death was attributed to acute DDT poisoning.

Representative published reports of nonfatal poisoning from DDT powder include contamination of eye causing temporary blindness,[1] inhalation of powder resulting in respiratory difficulty,[2] contact dermatitis,[3] the ingestion of nonfatal quantities as the result of food contamination [4] and anxiety, tremors and cramps in an insecticide demonstrator exposed to DDT dust.[5]

CASE 2.—A 30 year old farmer, who was in apparently good health, sprayed his barn with DDT and lime. The operation required close contact with the spray for approximately one week. Then the patient noticed bleeding gums, sore throat

1. Mackerras, I. M., and West, R.: M. J. Australia **1**: 400, 1946.
2. Velbinger, H. H.: Pharmazie **2**: 268, 1947.
3. Strycker, G. V., and Godfroy, B. J.: J. Missouri M. A. **43**: 384, 1946.
4. Jude, A., and Girard, P.: Ann. de méd. lég. **29**: 209, 1949. Mackerras and West.[1] Garrett, R. M.: J. Alabama M. A. **17**: 65, 1947. Naevestad, R.: Tidsski. norske Lægefor. **67**: 261, 1947. Thoung, U. C.: Indian B. Gaz. **81**: 432, 1946. Mühlens, K.: Deut. med. Wochschr. **17**: 164, 1946.
5. Campbell, A. M. G.: Lancet **2**: 1178, 1949.

and red spots on his tongue and over the rest of his body. Physical examination revealed multiple petechiae over the entire body and on the palate and gums with a completely aplastic bone marrow. Past history and neurologic examination were negative. The patient was hospitalized but continued a down hill course with death intervening two weeks after the first exposure. Death was caused by a massive hemorrhage secondary to thrombocytopenia. The condition was diagnosed as DDT intoxication of the bone marrow. The patient apparently exhibited extreme sensitivity to DDT or an unnamed solvent should the latter have been present in the spray mixture.

Published reports of other severe, and possibly allergic, reactions to DDT formulations include a fatal sensitization to a 6 per cent DDT-kerosene spray,[6] allergic rhinitis due to an unspecified DDT spray [7] agranulocytosis from a DDT aerosol,[8] contact dermatitis from DDT sprays [9] and purpura following exposure to DDT spray products.[10]

CASE 3.—A laborer, aged 32, was found dead at the entrance to mushroom-growing sheds.[11] In the shed was a two gallon drum of an emulsion concentrate of 20 per cent DDT and 40 per cent methylcyclohexanone. Analysis of the stomach contents showed the presence of approximately 180 Gm. (6 oz.) of the concentrate. At least 34 Gm. of DDT and 72 cc. (V/V) of methylcyclohexanone, respectively, were ingested. Since methylcyclohexanone is thought to be a comparatively nontoxic solvent, DDT was probably the primary cause of death, the solvent augmenting its toxicity by facilitating the absorption of DDT.

There are other reports of fatalities due to the ingestion of DDT solutions in which the solvent was thought to play a more important role.[12]

Nonfatal poisonings by this route of administration have also been reported.[13]

COUNCIL ON PHYSICAL MEDICINE AND REHABILITATION

The Council on Physical Medicine and Rehabilitation has authorized publication of the following reports.

HOWARD A. CARTER, *Secretary.*

ABSTRACT OF THE MINUTES OF THE MEETING OF THE COUNCIL ON PHYSICAL MEDICINE AND REHABILITATION DEC. 1 AND 2, 1950

The Council on Physical Medicine and Rehabilitation held its Annual Meeting at the A. M. A. Headquarters in Chicago, on Dec. 1 and 2, 1950. The following Council members were present: Drs. Frank H. Krusen, Frank R. Ober, Morris A. Bowie, Anthony C. Cipollaro, W. E. Garrey, William E. Grove, George Morris Piersol, Derrick Vail, Shields Warren and Walter J. Zeiter.

Dr. Frank H. Krusen was reelected Chairman and Dr. Frank R. Ober was reelected Vice-Chairman. The Council reviewed its activities in the fields of rehabilitation. It is concerned principally with physical restoration and personnel, whereas the Council on Industrial Health is interested in vocational guidance, training and placement of the handicapped workers. A liaison committee of three members from each Council was appointed.

Two radioactive products submitted to the Council were considered, one for treating the eyes and another for the prevention of deafness by irradiation of the lymphoid tissue about the opening of the eustachian tube into the nasopharynx. On the basis of the evidence presented the Council did not believe that these products could be accepted without reservations at the present time.

The subject of dual-purpose lighting was reconsidered. Some ultraviolet lamps which generate a white light for illumination have been recommended for installation in offices, gymnasiums, homes and other enclosed places. The promoter claims that the health of occupants will be benefited by exposure to ultraviolet radiation. The Council voted to reaffirm its previous decision to withhold acceptance of the postulatory principle of dual-purpose lighting because the promulgators of this idea have not presented critical clinical evidence substantiating its therapeutic or prophylactic value.

In the field of education the Council voted to advise the Council on Medical Education and Hospitals to encourage all medical schools to develop organized programs for teaching, clinical practice and research in physical medicine and rehabilitation at the undergraduate level. The Council noted a serious shortage of ancillary personnel in the fields of physical therapy and occupational therapy and studied ways and means for encouraging medical schools to establish courses for physical and occupational therapists. The Council felt that it was unnecessary to establish a separate field of corrective therapy and suggested that anyone seeking recognition in this field should first receive training in a school of physical therapy or a school of occupational therapy.

The Council reviewed the subject of blood-irradiation and decided that insufficient evidence was available to justify acceptance of devices designed for this purpose.

In connection with the subject of publications, the Council considered recent increases in the size and cost of the booklet "Apparatus Accepted." These factors have tended to limit its distribution. The Council voted to revise and condense the booklet so as to insure a continued wide circulation.

HYDRO THERMAL UNIT ACCEPTED

Manufacturer: Hydro Thermal Units, Inc., 901 North State Street, Chicago 10.

The Hydro Thermal Unit applies heat by means of water circulating through a coil of rubber tubing. This coil, referred to as the Hydro Mat, is one of the essential parts; the other is an electrically operated pump with a thermostatically controlled heating arrangement. The Hydro Mat is placed in apposition to the part to be warmed, while the pump, mounted on casters, stands by the bedside. The motor operates only on alternating current at 120 volts, and it draws about 200 watts of power.

Hydro Thermal Unit with Hydro Mat

Unpacked, the device stands 76 cm. high (30 in.) and the unit weighs approximately 16 Kg. (35 lb.). Packed for shipment it makes a package measuring 76 by 46 by 46 cm. (30 by 18 by 18 in.) and weighing 27 Kg. (60 lb.). Included in this shipping weight are one 10-foot (305 cm.) extension cord for the pump and one 5-foot (152 cm.) length of twin tubing to connect the pump with the Hydro Mat. Accessories are one chrome-plated stand with rubber casters, one 12-quart (11 liters) stainless steel water-container, and one dial thermometer graduated in Fahrenheit degrees from 0 to 220.

Evidence that this device was well constructed and that it performed as represented by the manufacturer was obtained from sources acceptable to the Council. The Council on Physical Medicine and Rehabilitation voted to include the Hydro Thermal Unit in its list of accepted devices.

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8. Wright, C. S.; Doan, C. A., and Maynie, M. C.: Am. J. Med. **1**: 562, 1946.
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10. Karpinski, F. E.: J. Pediat. **37**: 373, 1950.
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TREATMENT OF SUBACUTE BACTERIAL ENDOCARDITIS

Subacute bacterial endocarditis, more accurately designated as endocarditis lenta, is a slow, progressive disease in which vegetations are formed on valves and endocardium. These vegetations become organized and are followed by the production of new vegetations, so that ultimately the mass may be large, composed chiefly of vegetations and more deeply of granulation tissue and cicatrization. The micro-organisms responsible for the disease are principally those of alpha streptococci of the viridans group and gamma nonhemolytic streptococci. The cocci are readily stained in the superficial layers of the vegetations and less readily in the deeper fibrotic and calcified layers. A therapeutic agent, to be effective, must, therefore, be brought in contact with these vegetations over a long period of time in order to reach the cocci trapped in the deeper recesses of the vegetations.

The mortality of endocarditis lenta until the advent of antibiotics was almost 100 per cent. Lichtman,[1] writing as late as 1943, states that the incidence of spontaneous recovery is about 1 per cent. Four per cent of patients treated by sulfonamides appear to recover. The combined therapy of sulfonamides and heparin and of sulfonamides and hyperthermia yielded 6.5 per cent of recoveries. The introduction of penicillin into the treatment of this disease brought about a dramatic change in outlook. Dawson and Hunter[2] were able, in 1945, to report 15 patients cured in a group of 20. The infecting organism was Streptococcus. Heparin was employed as an adjuvant in most of these patients. Of five patients treated without heparin, four were cured. Gerber[3] treated 25 patients with penicillin but without heparinization. He reported complete elimination of infection in 22 patients by more careful attention to the attainment of high blood levels of penicillin. Of 29 patients treated by him, 22 have remained well and bacteria free for six to 19 months after discharge. Treatment with intermittent intramuscular injections of large doses of penicillin at three-hour intervals proved more effective than continuous intravenous administration of the same total daily amount. Gerber felt that the minimum duration of treatment should be five weeks. Christie,[4] reporting on 147 patients with 81 cures, 50 fatalities and 16 patients still under treatment, emphasized that the duration of treatment was more important than the total amount given.

Bloomfield,[5] in a recent review, emphasizes the importance of early diagnosis and of prophylactic exhibition of penicillin in connection with dental extractions and oral surgery. The question of the proper dose, he believes, can be answered only by determination of the sensitivity of the causative organism to penicillin. Intramuscular daily doses of 600,000 units of penicillin, given in two divided doses and continued for 30 days, will achieve sterilization in most patients. More resistant strains may require as much as 6,000,000 to 20,000,000 units daily.

Robbins and Tompsett[6] state that the therapeutic effectiveness of penicillin in subacute bacterial endocarditis has resulted in the arrest of the infection in all but 10 per cent of cases. The majority of this latter group of patients are infected with streptococci of the Lancefield serologic group D, the most important members of which are commonly termed Streptococcus fecalis and Streptococcus zymogenes. These authors observed that combined penicillin and streptomycin act as coadjuvants in inhibiting growth of all the studied strains of Enterococcus and Streptococcus viridans. Six patients with persistent enterococcic bacteremia, five of whom had endocarditis, have received 6,000,000 units of penicillin and 2 Gm. of streptomycin daily. Bacteremia was promptly reversed, and there was sustained clinical improvement in all. All but one patient have been followed for periods of six to 12 months, and none has relapsed. These uniformly good results are in striking contrast with the previous experience with the use of either drug alone in these infections and suggest that summation occurs in vivo comparable to that observed in vitro.

Fiese[7] calls attention to the fact that, while penicillin is capable of eliminating the infection in most patients with endocarditis lenta, it will not always prevent subsequent deterioration of cardiac function. Among the factors contributing to cardiac decompensation, he lists the previous reserve and size of the heart, the height of the temperature and the length of time before adequate treatment. Treatment with penicillin appears to postpone cardiac failure and to reduce its incidence.

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2. Dawson, M. H., and Hunter, T. H.: Treatment of Subacute Bacterial Endocarditis with Penicillin: Results in Twenty Cases, J. A. M. A. **127**: 129 (Jan. 20) 1945.
3. Gerber, I. E.; Shwartzman, G., and Baehr, G.: Penetration of Penicillin into Foci of Infection, J. A. M. A. **130**: 761 (March 23) 1946.
4. Christie, R. V.: Penicillin in Subacute Bacterial Endocarditis: Report to the Medical Research Council on 147 Patients Treated in 14 Centres Appointed by the Penicillin Clinical Trials Committee, Brit. M. J. **1**: 381 (March 16) 1946.
5. Bloomfield, A. L.: The Present Status of Treatment of Subacute Bacterial Endocarditis, Circulation **2**: 801 (Dec.) 1950.
6. Robbins, W. C., and Tompsett, R.: Abstract. The Summation of Penicillin and Streptomycin Activity In Vitro and in the Treatment of Subacute Bacterial Endocarditis, J. Clin. Investigation **38**: 1043 (Sept.) 1949.
7. Fiese, M. J.: Cardiac Failure in Penicillin-Treated Subacute Bacterial Endocarditis, Arch. Int. Med. **79**: 436 (April) 1947.

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The effectiveness of chloramphenicol and aureomycin and of terramycin has not so far been adequately investigated. It is reasonable to anticipate that endocarditis lenta caused by organisms sensitive to one of these should be cured by the corresponding antibiotics.

Early diagnosis, isolation of the causative microorganism, determination of its sensitivity to penicillin, proper dosage and an adequate duration of the treatment are at present the most important factors in obtaining cures. Properly pursued, these factors will do much to aid in overcoming a disease that formerly was practically uncontrollable by medical measures.

INSECTICIDE STORAGE IN ADIPOSE TISSUE

Administration of drugs which have cumulative properties requires greater caution than is needed with substances that have little or no tendency for tissue storage. In some instances the accumulation of certain chemicals may do no more than local harm, as in the case of the deposition of silver in the skin, which produces argyria, or of fluoride in the teeth, which produces mottled enamel. When the chemicals begin to pile up in parenchymatous tissues, retention becomes important. There are a few instances where cumulative effect of a chemical is desirable; e. g., the effectiveness of digitalis depends on its accumulation in the tissues, and the therapeutic value of iodine depends on its deposition in the thyroid gland. For the most part, however, tissue build-up of a toxicant is undesirable; e. g., the retention of heavy metals by the liver and kidneys. Clinical tests have been devised to detect aberration of functions in these and other tissues, and the collection of dangerous amounts of cumulative chemicals can be kept under control. Little attention, however, has been given to adipose tissue. It is a matter of record that the newer chlorinated hydrocarbon insecticides possess a strong tendency to accumulate in the body fat, and the influence of such deposition of poisonous material in functioning tissue which comprises approximately 18 per cent of the body weight appears to have been overlooked.

Adipose tissue is not merely connective tissue which functions in a passive manner as a fat depot; it is also a structure possessing functions that have been compared to those of a ductless gland.[1] It has its origin in a primitive fat organ [2] and retains the independent special function of fat deposition when transplanted to another site in the same subject or even when the embryonic tissue is transplanted into the normal adult animal of the same species.[3] The tissue has a rich blood supply, and the mobilization and deposition of the fat is regulated by endocrine as well as nervous (sympathetic) influences. Although the presence of a number of enzymes in adipose tissue has been reported, it is not clear whether these enzymes are derived from the fat cells or from the blood. Nevertheless, enzymatic activity is carried out by the fat cells, which can accumulate glycogen, change carbohydrates into fat and transform one fatty acid into another. It has been asserted that, as part of the reticuloendothelial system, blood-forming functions may become established in adipose tissue under appropriate conditions,[4] and that the cells of the omentum are capable of forming antibodies.[5] The functions bearing directly on the mobilization and deposition of fat appear to be a continuous process. Complete fat turnover in the mouse on a constant diet is estimated to require six days.[6] The turnover in man is probably slower, because his metabolic rate is lower; it most likely varies within wide limits and must be greatly accelerated under conditions that make demands on the fat reserve.

It appears to be a reasonable assumption that adipose tissue, which has these many important functions, can be influenced by the presence of cumulative poisons such as the chlorinated hydrocarbon insecticides. Among the more important of these materials are dichlorodiphenyltrichloroethane (DDT), dichlorodiphenyldichloroethane (TDE), chlordane, methoxychlor, dieldrin, toxaphene and the isomers of benzene hexachloride. The accumulation of dichlorodiphenyltrichloroethane in fat tissue has been studied extensively, and it has been shown that this tissue acts as a biologic magnifier for the insecticide.[7] The ingestion of minute amounts of dichlorodiphenyltrichloroethane (about 1 part per million) in the diet of rats over a period of time causes accumulation in the fat which can be as high as 30 times the level of intake. It has been demonstrated that dichlorodiphenyltrichloroethane concentrations of 3 to 30 parts per million in the substrate inhibit rat heart cytochrome oxidase.[8] It is possible that this deposited DDT can influence enzymatic activity in adipose tissue. Furthermore, during the mobilization and deposition of fat, which involved the liver, the small but numerous insults experienced by the liver in metabolizing the dichlorodiphenyltrichloroethane-laden fat could lead to damage of this organ. At least minimal liver damage has been reported in animals that ingested DDT, at a rate of 5 parts per million in the diet, for prolonged periods.

Perhaps a better indication of the influence of a poison that is retained in the fat is the comparison of the effects of the four principal isomers of benzene hexachloride. If the degree or retention of gamma isomer in fatty tissue is assigned the value of 1, then alpha is rated as 2, beta as 10 and delta less than 1. Chronic effects of these isomers, when fed to rats, can be observed with 100 parts of gamma per million in the

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diet, 50 of alpha, 10 of beta and about 800 of delta. The direct relation between retention and chronic toxicity appears obvious.

The methoxy analog of dichlorodiphenyltrichloroethane, methoxychlor, also has an effect on enzymes similar to that of dichlorodiphenyltrichloroethane. However, no deposition in fat occurs, probably because the breakdown of the compound is so rapid in the body that none of the material is available for fat storage. Methoxychlor has a low order of chronic toxicity. Dichlorodiphenyldichloroethane, another analog, is stored in body fat to an even greater extent than dichlorodiphenyltrichloroethane,[9] but its chronic effect is only half that of dichlorodiphenyltrichloroethane. This is an exception which at present is unexplained.

Chemical methods for the detection of chlordane, dieldrin, aldrin and toxaphene in biologic materials have not yet been applied to tissue storage studies of these compounds. Chlordane has a high order of chronic toxicity; dieldrin and aldrin have a toxicity that appears to be equal to if not above that of chlordane. Such information as is available indicates that all of these compounds are stored in fatty tissues.

The influence of the stored insecticide may not be limited to adipose tissue. In fact, dichlorodiphenyltrichloroethane is found in all other tissues in proportion to their fat content. Fats and lipids are constituents of cell membranes and are concerned with the phenomena of cell permeability and cell organization in every tissue of the body. Also, embryonic fat cells have a great capacity for synthesis of cholesterol. The importance of cholesterol in the formation of vitamins and hormones is well established.[10] Consequently, storage of a toxicant in the fat of parenchymal cells is essentially storage in the cell itself, where such important enzymatic processes as oxidation, phosphorylation and cholesterol synthesis take place. The fact that TDE specifically affects the adrenal cortex of the dog gives credence to this postulation.[11]

At present, compounds of the chlorinated hydrocarbon group of insecticides that are fat soluble and chemically stable appear to be readily retained in adipose tissue. Such compounds possess a high order of chronic toxicity, and it is believed that at least part of these effects may be due to the adverse influence the chemicals have on important functions of adipose tissue. A review of the pharmacologic and toxicologic aspects of dichlorodiphenyltrichloroethane, one of the better known members of this group of chemicals, is presented elsewhere in this issue of THE JOURNAL as a report of the Committee on Pesticides, a standing committee of the Council on Pharmacy and Chemistry.

9. Woodard, G.; Davidow, B., and Nelson, A. A.: Effects Observed in Dogs Following Prolonged Feeding of DDT and Its Analogs, Federation Proc. **7**: 267, 1948.

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ALTERNATIVE METABOLIC PATHWAYS

The availability of isotopes of many common chemical elements which may be followed in the animal organism has proved of great value in the medical sciences. Particularly is this true in investigations of the intricate processes of cellular metabolism. "Tracer" elements have made possible the elucidation of the metabolic pathways of many "essential metabolites," as is emphasized in a current review [1] of this subject. Supplementary studies with various naturally occurring and artificially induced mutant strains of micro-organisms with their altered nutritional requirements have likewise proved of considerable aid in elucidating metabolic pathways.

In the review cited above, the Wisconsin investigators discuss the present knowledge of the metabolism of a number of specific "essential metabolites." The fact that two or more alternative pathways of metabolism are usually demonstrable is stressed. For example, studies with pyruvic acid labeled with radioactive carbon 14 as a "tracer" have demonstrated that at least eight different metabolic pathways are open to this important intermediate in carbohydrate metabolism. Similar studies on other carbohydrate intermediates have likewise disclosed multiple pathways of metabolism, as is true also of a number of the amino acids, of uric acid and certain other purines and of cholesterol. The simplest amino acid, glycine, has been shown to have at least 11 possible paths of metabolic utilization, including the formation of porphyrins, creatine, glutathione, uric acid and certain other purines.

The mechanisms involved in regulating the various metabolic pathways of essential metabolites have also received a considerable amount of attention. While the actual mechanisms involved are still largely unknown, a number of factors concerned have been demonstrated. These include genetic effects, certain hormones, enzymes and coenzymes, the amount of substrate and the presence of antimetabolites. Thus the metabolic fate of many essential metabolites is not a fixed static situation but may vary widely in different cells, in different tissues of the same organism and, indeed, in the same tissue under different circumstances.

Practical medical implications of the above fundamental observations are at once apparent. It is not unreasonable to suppose that in many pathological conditions (for example, in diabetes mellitus) the ultimate abnormality may prove to be an impairment of a single enzymatic reaction vital to an essential metabolic pathway. Also, in neoplastic growths, there may exist an abnormal balance between catabolic and anabolic enzymes. The increased rate of growth of neoplastic tissue may thus result from a deficiency of some oxidative enzyme or overactive anabolic enzyme. Even now there is some experimental evidence to support each of these hypotheses. By fundamental studies as described above, it should be possible to locallize the metabolic defect in pathological conditions such as these, and in turn, this information should point the way to a rational and effective therapy.

1. Potter, V. R., and Heidelberger, C.: Alternative Metabolic Pathways, Physiol. Rev. **30**: 487 (Oct.) 1950.

V 14
1951

ORGANIZATION SECTION

STATEMENT BY THE BOARD OF TRUSTEES

NIGHT AND EMERGENCY CALL SYSTEMS

The Board of Trustees is pleased to report that local medical societies have made excellent progress in establishing night and emergency call plans during the past three years. In the summer of 1948, a national survey showed 60 such plans in operation. In February 1951, only two and one-half years later, another survey revealed that there are 329 night and emergency call plans established and functioning.

While these plans vary greatly according to the size of the community, they all have the same purpose—to guarantee that the people of the community can obtain a doctor at any time of the day or night, any day in the year. The systems are so efficient that even in New York County, which operates the largest emergency call system in the country, it requires no more than seven or eight minutes to have a doctor on his way to answer a call. "Planning for Emergency Medical Calls," a booklet which describes the operation of 16 representative plans, is available from the Council on Medical Service of the American Medical Association.

Physicians have traditionally taken care of their own patients to the best of their ability, answering calls at all hours. They make provision for other doctors to take over their practices when they are out of town. They also train their office staffs and families to handle calls when they are not available for other reasons. But there are always people who do not have a family physician, travelers who become ill away from home and patients who cannot locate their physician in an emergency. The Board of Trustees believes that the medical profession should assume collective responsibility for these people through night and emergency call plans.

While great progress has been made, there are still communities in which no such plan has been established. As long as this is true, there will be newspaper stories of tragedies such as the death of a baby while his frantic father is trying to locate a physician. All the increased knowledge and improved technics of modern medicine are of no avail to the patient who cannot find medical help when illness strikes.

The Board of Trustees therefore strongly urges that all county medical societies that have not yet established a formal plan for answering night and emergency calls make that a completed project during the coming year.

REVIEWS OF MEDICAL MOTION PICTURES

The Committee on Medical Motion Pictures has completed the first supplement to the second revised edition of the booklet entitled "Reviews of Medical Motion Pictures." This supplement contains 86 reviews of medical and health films reviewed in THE JOURNAL from Dec. 31, 1949 to Jan. 1, 1951. Each film has been indexed according to subject matter. The purpose of these reviews is to provide a brief description and an evaluation of motion pictures which are available to the medical profession.

Copies have been sent to the secretary of each of the state medical societies. Complimentary copies will be sent to county medical societies and other medical organizations on request.

AWARDS IN THE SCIENTIFIC EXHIBIT

At a recent meeting, the Committee on Scientific Exhibit voted to change the procedure in making awards in the Scientific Exhibit at the Annual Session so that each Section would be included. Awards will be made as follows:

Medals.—Gold, silver and bronze medals will be issued in each of two groups—group 1 for original investigation and group 2 for excellence of presentation and teaching value. (This same procedure has been followed in the past.)

Certificates of Merit.—A certificate of merit will be awarded to the best exhibit in each Section. The Committee on Awards may, at its discretion, award certificates to more than one exhibit in a Section, or, if no exhibit in a Section is deemed worthy, an award may be omitted.

Honorable Mention and *Special Mention* may be made at the discretion of the Committee on Awards.

MEDICAL LEGISLATION

FEDERAL

Federal Aid to Medical Education

Representative Bolling of Missouri introduced H. R. 2707, which would amend the Public Health Service Act and the Vocational Education Act of 1946 to provide an emergency program of grants and scholarships for education in the fields of medicine, osteopathy, dentistry, dental hygiene, public health and nursing. This bill is identical with S. 337 as reported out by the Senate Labor and Public Welfare Committee on February 15.

Voluntary Health Insurance Study

H. Res. 136, introduced by Representative Multer of New York, proposes to create a select committee to study health insurance. It would create a special committee to be appointed by the Speaker of the House of Representatives to conduct a study and investigation of the operation of accident, health and hospitalization insurance companies, associations, societies, funds and any other factors pertinent to the subject. The committee would make a report and recommendations to the present Congress.

Representative Multer also introduced H. Res. 137, which would authorize the expenditure of $100,000 to carry out the objectives outlined in H. Res. 136. This amount could be used for such items as salaries of staff, travel and stenographic service.

STATE

Arizona

Bill Introduced.—H. 226, proposes the creation of a **board of medical technology examiners** to regulate and license the practice of medical technology which is defined to include serology, bacteriology, parasitology, biochemistry, histology, blood bank procedures, hemotology, and electroencephalography.

Arkansas

Bill Introduced.—H. 403, proposes to require every applicant for a marriage license to present a **medical certificate from a duly licensed physician certifying** that the applicant has been given a physical examination for syphilis and found not to be infected with syphilis in a communicable stage.

Colorado

Bills Introduced.—S. 216, proposes general revisions and amendments to the **medical practice act.** Among other things the proposal would include two osteopaths on the medical examining board. S. 293, proposes to prohibit the sale of dangerous drugs except by a pharmacy upon the **prescription of a physician,** dentist, chiropodist or veterinarian, with certain exceptions relating to manufacturers, wholesalers, etc. The term

The summary of federal legislation was prepared by the Washington Office of the American Medical Association and the summary of state legislation by the Bureau of Legal Medicine and Legislation.

dangerous drug is defined to include any hypnotic drug, aminopyrine, amphetamine, desoxyephedrine, cinchophen, neocinchophen, diethyl-stilbestrol, sulfanilamide, anti-biotics or hormones and thyroid and compounds or mixtures of any such drugs.

Connecticut

Bill Introduced.—H. 1481, proposes to provide that each and every one of the various examining boards of the branches of the **healing arts** may review the qualifications of its own applicants.

Georgia

Bill Enacted.—H. 115, has become Act 148 of the Acts of 1951. It authorizes the state **board of medical examiners** to examine and regulate applicants desiring to practice physical therapy which is defined to mean the treatment of any bodily or mental condition of any person by the use of the physical, chemical and other properties of heat, light, water, electricity, massage and active and passive exercise. The use of roentgen rays and radium for diagnostic and therapeutic purposes, including cauterization, are not permitted under this new law.

Illinois

Bill Introduced.—S. 119, to amend the public assistance code, proposes to permit certifications of blindness to be executed by **optometrists** as well as physicians.

Indiana

Bill Introduced.—S. 225, proposes that any person who subsequent to July 1, 1940, had been lawfully inducted into the armed services, and was at the time of induction a licensee of the state of Indiana, may apply for a **renewal of his license** within six months after termination of his service without examination, reexamination, fine or penalty.

Kansas

Bills Introduced.—H. 164, proposes to authorize a district judge to order the **exhumation** of the body of a deceased person for purposes of physical or chemical examination or analysis to ascertain the cause of death. H. 337, proposes to require the state board of medical registration and examination to revoke the license of any practitioner of medicine who accepts in addition to his fee for professional service any **rebate, commission or other type of payment** either directly or indirectly in connection with the writing or filling of a prescription, except in those cases where the licentiate compounds or dispenses his own prescriptions.

Maryland

Bills Introduced.—H. 262, proposes to require all persons desiring to be married to present a **certificate signed by a licensed physician or osteopath** certifying that the applicant has submitted to a standard laboratory test and that in the opinion of the physician is not infected with syphilis in a communicable stage. H. 294, to amend the **chiropractic act,** proposes that chiropractors, at the time of the annual renewal of their license, shall present evidence that they have attended at least one two-day educational conference during the preceding year, which conference shall be offered by the Maryland Chiropractic Association.

Minnesota

Bills Introduced.—H. 695, proposes the creation of a **state board of examiners of psychiatric aides** and defines a psychiatric aide as a person who has worked on a ward in a mental hospital and whose duties have included the care and treatment of the mentally ill. H. 900, to amend the **hospital licensing law,** proposes to include institutions furnishing maternity care and institutions furnishing chronic and convalescent care. S. 601, proposes the creation of a commission to make a survey of the state's facilities for the diagnosis, treatment, and **control of tuberculosis.**

Missouri

Bills Introduced.—H. 244 and H. 270 propose to direct the curators of the University of Missouri to establish a full and complete **course of medical and surgical instruction** in the University of Missouri.

Nevada

Bills Introduced.—A. 57, to amend the chiropractic act, proposes regulations for the licensing of persons desiring to practice **chiropractic-physiotherapy** which is defined to be the adjustment of the articulations of the human body by hand and the use of electrical, mechanical, hygienic and sanitary measures, which measures do not pierce or sever the body tissue. A. 124, proposes regulations for the **licensing of hospitals,** nursing and maternity homes. A. 130, to amend the **medical practice act,** proposes to authorize the board to issue temporary or limited permits granting the applicant the right to serve as resident medical officer in any hospital in the state. Such permit would not permit the holder to engage in the private practice of medicine, surgery or obstetrics in the state of Nevada.

New Jersey

Bills Introduced.—A. 307, proposes the **creation of a state medical college.** A. 486, proposes to require **annual registration** of persons licensed to practice medicine and surgery, osteopathy or chiropractic.

New Mexico

Bill Introduced.—S. 182, to amend the law relating to osteopathy, proposes a **new definition of osteopathy** which is "that system of the healing arts which places the chief emphasis on the structural integrity of the body mechanism and as being the most important factor for maintaining the organism in health."

New York

Bills Introduced.—A. 2031, proposes the creation of a **state board of examiners of psychologists** and defines a person practicing psychology as one who holds himself out to the public as a psychologist and represents himself as being able to appraise or classify mental abilities, personality characteristics or personal or interpersonal maladjustment or to perform psychological reeducation, psychological readjustment, psychological guidance or counseling for any person, corporation or association. A. 2254, proposes the creation of a temporary commission to make a study and survey of the prevalence and facilities for the treatment of all forms of **heart disease** within the state. A. 2337, proposes to require the superintendent and other persons in charge of any hospital, sanitarium or convalescent home to cause every employed person therein, at least once a year, to be examined for the purpose of determining whether or not such employee is suffering from **tuberculosis.** A. 2489, to amend the law relating to the conducting of **scientific tests upon living animals,** proposes to delete from the present law the exemption in favor of laboratories or institutions approved and licensed by the state commissioner of health. Instead the proposal would provide merely that if an act of cruelty to living animals is in the conducting of any scientific test experiment or investigation, the person performing the act is guilty of a felony and shall be punished by fine or imprisonment. S. 1977, proposes the creation of a **board of examiners for clinical laboratories and clinical laboratory directors.** The proposal defines a clinical laboraory as a place, establishment or institution organized and operated primarily for the performance of all or any bacteriological, biochemical, microscopical, serological, parasitological, and/or other tests by the practical application of one or more of the fundamental sciences to material originating from the human body by the use of special apparatus equipment and methods for the purpose of obtaining scientific data which may be used as an aid to ascertain the state of health. A clinical laboratory director is defined as a person who supervises the technical work in such a clinical laboratory. S. 2193, proposes an appropriation to the state department of health for the purpose of conducting experiments in cooperation with the Medical Society of New York State in mass detection of diseases in their early stages through the process of **multiphasic screening.**

Bill Enacted.—A. 641, has become Chapter 30 of the Laws of 1951. It amends the education law by constituting the board of medical examiners as a **board of examiners in physical therapy.**

Ohio

Bills Introduced.—H. J. R. 14, proposes the creation of a committee to study all matters related to the adequacy of **medical and dental school facilities** in the state. S. 174, proposes to authorize the use of certain **dead bodies** upon the request of the chief of the medical staff of any hospital which provides instruction in medicine and surgery.

Pennsylvania

Bills Introduced.—H. 154, proposes to require courses in the effects of **alcohol and narcotics** to be taught in the public schools and colleges of the state. H. 259, to amend the law relating to hospitals of certain sizes, proposes that each hospital having one hundred (100) or more beds shall also have at least one member of its **board of trustees who is a licensed physician** and a resident of the community in which the hospital is located. H. 271, proposes that all hospitals having at least one hundred (100) beds shall at all times have in attendance at least one **resident physician or resident intern** who shall have graduated from an approved medical college or approved osteopathic college, if such hospital is an osteopathic hospital. H. 357, proposes the enactment of a **permissive sterilization act.** H. 367, proposes to require every physician, osteopathic physician or other person practicing the healing arts in the state to report to the department of revenue the name and address of every person consulted by such practitioner who is suffering from any kind of **heart disease** which may cause such person to be seized with a heart attack or to suffer syncope while operating a motor vehicle. H. 389, proposes to require all administrative boards to obtain **finger prints and photographs** of all persons making application for the issuance or renewal of any license to practice a profession. S. C. R. 113, proposes that the department of health and other departments of the state government be urged to encourage and to cooperate with the AMVETS in a successful prosecution of their program of **blood typing.** S. 146, proposes an appropriation to the Jefferson Medical College for the maintenance and support of a Research Institute of **Preventive and Industrial Medicine.**

South Dakota

Bill Introduced.—H. 361, proposes that proof that a person appends to his name the word **"doctor", the abbreviation "Dr."** or any other word, abbreviation or designation which indicates that he is qualified for diagnosis or treatment shall constitute prima facie evidence that such person is holding himself out, within the meaning of the healing art practice act, as qualified to engage in such diagnosis or treatment. To do so would constitute a misdemeanor in the absence of a license.

Bill Enacted.—S. 159, was approved Feb. 15, 1951. It provides regulations for the licensing, by the state department of health, of institutions which desire to obtain **animals** from establishments maintained by or for municipalities and to use such animals only **in the conduct of scientific and educational activities.**

Wisconsin

Bill Introduced.—S. 374, proposes to authorize the medical board to issue licenses to practice **medicine and surgery or osteopathy and surgery** and to accept, in lieu of its own examination the certificate of the National Board of Medical Examiners.

V 14
1951

MEDICAL NEWS

CALIFORNIA

County Secretary for 34 Years.—Dr. Joseph O. Chiapella, Chico, who served as secretary-treasurer for 34 consecutive years with the Butte-Glenn Medical Society, is to be succeeded in that post by his son, Dr. William Chiapella. Dr. William Chiapella joined his father in practice in 1949, and a second son Karl is expected to join him this summer.

Preventive Medical Services Reorganized. — Organizational changes have been made in the state health department Division of Preventive Medical Services. Four new bureaus have been created, namely, the Bureau of Acute Communicable Diseases, the Bureau of Chronic Diseases, the Bureau of Venereal Diseases and the Bureau of Tuberculosis Control. These bureaus were formerly grouped as services under a Bureau of Disease Control, which is now eliminated. The new Bureau of Crippled Children Services was formerly a service within the Bureau of Maternal and Child Health. Dr. Frederic M. Kriete, San Francisco, former chief of the Bureau of Maternal and Child Health, has been appointed assistant chief of the division.

CONNECTICUT

Hospital News.—The new 115 bed Bishop McAuliffe Lying-In Wing of St. Francis Hospital, Hartford, will be dedicated March 12. Dr. Herbert E. Schmitz, chairman, department of obstetrics and gynecology, Mercy Hospital and Loyola University Clinics, Chicago, will speak at 8 p. m. on "Newer Trends in Obstetrics."

Personal.—Dr. Albert S. Gray, Hartford, director of the Bureau of Industrial Hygiene of the Connecticut State Health Department, has been appointed deputy commissioner of health in Connecticut. Dr. Gray has been the director of the Bureau of Industrial Hygiene since 1928.

ILLINOIS

Personal.—Dr. Roland I. Pritikin, Rockford, will leave March 12 for a research and lecture tour of the eye departments of various universities in Western Europe and the Near East. This is being done under the sponsorship or cognizance of governmental agencies and national medical and surgical societies.

Quincy Bulletin Resumes Publication.—After suspended publication of nearly a year and a half, the *Quincy Medical Bulletin* resumed publication with the February issue. The new editor, is Dr. Hilliard M. Shair of Quincy. Established in February 1924, the bulletin was published regularly until September 1949. Dr. Shair is the eighth editor during the period of nearly 27 years. The *Quincy Medical Bulletin* is the only county medical periodical in a large territory comprising Northeastern Missouri, Southeastern Iowa and Central Western Illinois. The nearest county medical society publication is at Springfield, Ill., 100 miles east.

Chicago

Chicago Medical Society to Move to Library Building.—The Chicago Medical Society expects to move about May 1 to the John Crerar Library Building at Michigan Avenue and Randolph Street where it will have 60 per cent more space and be able to keep all its departments together.

Course in Pediatrics.—Michael Reese Hospital Postgraduate School will hold a one week course in "Recent Advances in Pediatrics—Diagnostic and Therapeutic Measures" May 21-26. Clinical and didactic material will be presented by members of the department of pediatrics and cooperating departments. For information address the dean, 29th and Ellis avenue, Chicago 16.

Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education and public health. Programs should be received at least two weeks before the date of meeting.

Appoint Deans at Chicago Medical School.—Dr. Francis J. Mullin, dean of students at the University of Chicago, division of biological sciences including the medical school, has been appointed dean of the Chicago Medical School and professor of physiology. Dr. Andrew H. Ryan, on the faculty of the Chicago Medical School since 1944, will become dean of students while continuing in his present capacity of associate professor of physiology. Dr. Ryan has held professorships in the medical schools of the University of Pittsburgh, Tufts College and the University of Maryland.

KANSAS

Annual Porter Lectures.—The Eighteenth Annual Porter Lectureship in Medicine of the University of Kansas School of Medicine, Kansas City, will be given by Davenport Hooker, Ph.D., head, department of anatomy, University of Pittsburgh School of Medicine. The first lecture will be held at the Medical Center at 4: 00 p. m. March 12. Dr. Hooker will speak on "The Sequence in Human Fetal Activity." The second lecture will be in Strong Hall on the Lawrence Campus at 11: 00 a. m. March 13 on "Fetal Activity in Infrahuman Vertebrates." The concluding lecture will be at the Medical Center at 4: 00 p. m. March 13, when Dr. Hooker will speak on "The Significance of Structural and Functional Interrelations in Prenatal Activity." Funds for the Porter Lectureship were provided by a bequest of the late Dr. J. L. Porter, of Paola, Kan., who left to the school of medicine money for scholarship and research.

MASSACHUSETTS

Children's Accident Handbook.—Children's Hospital, Boston, has issued an accident handbook for parents to aid in preventing accidents to which children are subject in the home and to supply those who have the care of children with instruction as to what to do and what not to do if accidents occur. In the 24 illustrated pages the handbook deals with eight important injuries to children, includes a list of items to keep on hand for use in case of accidents and a safety check list of dangerous points in homes. It may be obtained for 25 cents from the Children's Medical Center, Inc., 300 Longwood Ave., Boston 15.

Fracture Course.—The orthopedic department of Boston City Hospital and the Boston University School of Medicine will give a postgraduate fracture course in the Dowling Amphitheatre of the hospital April 18-21. The guest conductor will be Dr. Lorenz Bohler of Vienna, who will lecture on six subjects, including intramedullary nailing of long bones. Other speakers will be Dr. Herbert F. Moseley of Montreal, Dr. Preston A. Wade of New York and Dr. J. Huber Wagner of Pittsburgh. The visiting staff of the orthopedic service comprises the remainder of the faculty. Applications will be accepted in the order in which they are received until the capacity of the amphitheatre is reached. The fee, $50, payable to Boston City Hospital Postgraduate Fracture Course, is to be mailed with application to Miss Louise Curry, Secretary, Sixth Surgical Service, Boston City Hospital, 818 Harrison Avenue, Boston.

MICHIGAN

Dr. Coller Receives Medal.—On February 15 the Buffalo Surgical Society presented the Roswell Park Memorial Medal for "outstanding surgical achievement" to Dr. Frederick A. Coller, professor and chairman of the department of surgery, University of Michigan Medical School, Ann Arbor. Dr. Coller is the fourth recipient of this award. Previous recipients have been Dr. Allen O. Whipple, New York; Dr. Evarts A. Graham, St. Louis, and Dr. Dallas B. Phemister, Chicago. The title of Dr. Coller's Roswell Park lecture was "Indications for Thyroid Surgery with Present Day Knowledge of Antithyroid Drugs and Radioactive Iodine."

MINNESOTA

Phi Delta Epsilon Lecture.—Dr. Paul Klemperer of Mount Sinai Hospital, New York, will deliver the annual Phi Delta Epsilon Lecture at the Museum of Natural History, University of Minnesota, Minneapolis, at 8: 15 p. m. April 5. His subject will be "The Concept of Collagen Diseases." Doctors of the Twin Cities area and the rest of the state are invited to attend.

Dr. Moore Wins Gross Prize.—The 1950 Samuel D. Gross Prize of the Philadelphia Academy of Surgery, $1,500, has been awarded to Dr. George E. Moore, Minneapolis, for his essay, "Diagnosis and Localization of Brain Tumors: A Clinical and Experimental Study Employing Fluorescent and Radioactive Tracer Methods." The prize is awarded every 5 years to the writer of the best original essay, illustrative of some subject in surgical pathology or surgical practice founded on original investigations.

Continuation Course in Urology.—The University of Minnesota announces a continuation course in urology to be presented at the Center for Continuation Study on April 2-6. The course is given under the sponsorship of the North Central Section of the American Urological Association. Dr. Charles D. Creevy, professor of surgery and head of the Division of Urology, is faculty chairman for the course. Visiting physicians who will participate are Dr. Hugh J. Jewett, Baltimore; Dr. Lloyd G. Lewis, professor, department of urology, Georgetown University Medical School, Washington, D. C.; Dr. Reed M. Nesbit, professor and chief, department of urology, University of Michigan Medical School, Ann Arbor, and Dr. Parke G. Smith, professor and head, department of urology, University of Cincinnati in Cincinnati.

MISSOURI

Nonmedical Library for Medical Students.—Washington University School of Medicine, St. Louis, has received a gift of $50,000 from Miss Mary G. Reber for a nonmedical library in its proposed Medical Student Dormitory Center. A permanent endowment fund of $15,000 may be set aside from the total $50,000 for maintenance. Miss Reber has requested that the library be furnished as the living room of a home, with shelves filled with books and current periodicals of cultural and general interest. Should the university find it not feasible to construct the Student Dormitory Center, the $50,000 gift is to be used to establish a permanent endowment known as the Reber Fund, the income to be used in assisting worthy students to complete their medical education. If there should be no need for a scholarship fund, the income may be used in other fields useful to medicine and of benefit to humanity.

NEW YORK

Cardiological Symposiums.—The New York Cardiological Society has been conducting a series of symposiums on current cardiovascular practice at the New York Academy of Medicine. Each session consists of four 20 minute papers by specialists in various subjects, with a 10 minute discussion of each. They are kept clinical and practical since the general profession and medical students are invited. The remaining program is as follows:

April 12, Current Problems in Experimental Cardiology.
May 23, Current Management of Cardiac Failure.

Further information may be had from the secretary, Dr. Philip Reichert, 480 Park Avenue, New York 22.

Speech and Voice Clinic.—A new clinic facility for the diagnosis and treatment of patients with voice and speech disabilities has been inaugurated at the Syracuse Dispensary. The clinic will be limited to patients of the school age group only, for the present, and this will include children up to 16 years of age. The services will be available to those who are unable to pay for private medical care. Later the facilities may be extended to all age groups. The first session of the Speech and Voice Clinic was held on January 17. Sessions will be held on the first and third Wednesdays of each month at 1: 30 p. m. The clinic will be staffed by members of the department of otolaryngology of the College of Medicine of Syracuse University, with Dr. William G. Peacher as the consultant on the neurological aspects of speech correction.

Postgraduate Instruction.—The Medical Society of the State of New York in cooperation with the New York State Department of Health has arranged the following postgraduate lectures. The staff of St. Joseph's Hospital, Yonkers, will be addressed by Dr. Charles L. Fox Jr., New York, on "Plasma, Whole Blood and Electrolyte Therapy" March 14 at 9 p. m. at the hospital. Dr. Thomas H. McGavack, New York, will speak on "Clinical Applications of ACTH, Cortisone and Pregnenolone" at a meeting of the Cayuga County Medical Society at 8: 30 p. m. March 15 at Auburn City Hospital in Auburn. The Edward J. Barber Hospital and the Wayne County Medical Society meeting on March 16 from 11 a. m. to 1 p. m. at the Hotel Wayne in Lyons, will hear Dr. George H. Marcy, Buffalo, speak on "The Treatment of Low Back Pain."

New York City

Biggs Memorial Lecture.—The annual Hermann M. Biggs Memorial Lecture, to be given in Hosack Hall at the New York Academy of Medicine under the auspices of the Committee on Public Health Relations, will be delivered April 5 at 8:30 p. m. by Rene J. Dubos, Ph.D., member, Rockefeller Institute for Medical Research, on "Biological and Social Aspects of Tuberculosis." The lecture is open to the public.

Allergy Society Award.—The New York Allergy Society announces a prize of $150 for the best essay on a subject in immunology or clinical allergy. Competition is open to students of the medical schools of New York City. The essay ought not exceed 15,000 words. All papers must be sent to Dr. Frederick R. Brown, Secretary of the New York Allergy Society, 145 East 52nd Street, New York 22, prior to October 1.

Dr. Seegal Leaves State University.—On March 1 Dr. David Seegal resigned his position as professor of medicine, State University Medical Center at New York, and director of the medical services, Maimonides Hospital of Brooklyn, to accept the position of professor of medicine, College of Physicians and Surgeons, Columbia University, and director of the Columbia University Research Service, Goldwater Memorial Hospital, Welfare Island, New York.

Personals.—Dr. Irwin I. Lubowe has been appointed associate visiting dermatologist at Metropolitan Hospital.——Dr. John H. Dunnington, director of Vanderbilt Clinic at Presbyterian Hospital, has been elected to the board of directors of the National Society for the Prevention of Blindness. Dr. Dunnington is professor of ophthalmology at the College of Physicians and Surgeons, Columbia University, vice chairman of the American Board of Ophthalmology and president of the American Ophthalmological Society.

Multiple Sclerosis Exhibit.—An exhibit of selected books and journal articles on multiple sclerosis prepared by the National Multiple Sclerosis Society and the Library of the New York Academy of Medicine is on display at the library, 2 East 103d Street, to April 30, Mondays through Saturdays, 9 a. m. to 5 p. m. The material includes literature most useful to the practitioner, together with charts and photographs illustrating methods of rehabilitation. A list of the literature shown is available on request to the society at 270 Park Avenue, New York 17, or to the academy library. Other publications by the society are also on display and may be had from the latter on application.

NORTH CAROLINA

Hospitals Dedicated.—The Scotland County Memorial Hospital, a 75 bed facility, was dedicated at Laurinburg January 28. The hospital was built and furnished at a cost of about $1,200,000, nearly half of which was contributed by over 6,000 citizens of the county. The new 120 bed Pitt County Memorial Hospital was dedicated in Greenville January 18. It was constructed and equipped at a cost of over $1,417,000 and was built as a memorial to the services of Pitt County citizens in World Wars I and II. It stands on a 17½ acre plot donated by the heirs of the late Jesse Rountree Moye.

V 14
1951

Narcotic Violation.—Dr. James M. Williams, Warsaw, pleaded not guilty in the U. S. District Court at Wilmington to violation of the Federal Narcotic law and was found guilty on Nov. 21, 1950. On that date his sentence of 18 months was suspended, and he was placed on probation for a period of five years on condition that he surrender his special tax stamp, official order forms and all narcotic drugs that he possessed. It was further stipulated by the court that his special tax stamp might be returned to him after a period of 12 months provided the North Carolina Medical Board so recommended. He was also fined $500.

SOUTH CAROLINA

Memorial Clinics.—The Nineteenth Annual Medical and Surgical Clinics of Community Hospital at Union, held January 26, were dedicated to the memory of the late Dr. Charles R. Drew. A portrait of Dr. Drew was unveiled. At its 1950 conclave in Boston the Omega Psi Phi fraternity voted to name its scholarship fund in honor of Dr. Drew.

TENNESSEE

Course in Cardiovascular Diseases.—A postgraduate course in cardiovascular diseases, presented by the Memphis and Shelby County Heart Association, is being given for 12 consecutive Wednesday nights, March 7 through May 30. Speakers are all from Memphis. Tuition for the course is $20. Two lectures will be given each evening, one from 7:30 to 8:20 and the other from 8:30 to 9:20. The program is as follows:

March 7, Frank Harrison, Ph.D., Anatomy of the Cardiovascular System. Robert C. Little, Physiology of the Cardiovascular System.
March 14, Charles J. Deere, Taking the Cardiovascular History and Examination of the Cardiovascular System. Daniel A. Brody, Syphilitic Heart Disease.
March 21, I. Frank Tullis, Jr., Anticoagulant Therapy. David S. Carroll, Fluoroscopy and X-Ray of the Heart.
March 28, I. Ralph Goldman, Coronary Heart Disease. James E. Cottrell, Pain in the Chest—Is it Angina Pectoris?
April 4, Aaron M. Lefkovits, Etiology and Pathology of Rheumatic Heart Disease. John D. Hughes, Diagnosis and Treatment of Rheumatic Heart Disease.
April 11, Raphael N. Paul, Congenital Heart Disease in Daily Practice. Dr. Goldman, Physiological Tests in Congenital Heart Disease. Charles B. Olim, Surgery of Congenital Heart Disease.
April 18, Robert F. Ackerman, Arteriosclerotic Heart Disease, Etiology and Pathology. Hall S. Tackett, Arteriosclerotic Heart Disease, Clinical Course and Treatment.
April 25, Guest speaker to be announced.
May 2, Otis S. Warr, Jr., Hypertensive Heart Disease, Etiology and Pathology. Philip B. Bleecker, Hypertensive Heart Disease, Clinical Course and Treatment .
May 9, J. Pervis Milnor, Jr., New Orleans, Subacute Bacterial Endocarditis. Burt Friedman, Cor. Pulmonale, Acute and Chronic.
May 16, Dr. Deere, Myocarditis. Dr. Brody, Pericarditis. Dr. Goldman, Neurocirculatory Asthenia.
May 23, Dr. Olim, Peripheral Vascular Disease, Arterial Tree, Jack Greenfield, Peripheral Vascular Disease of the Venous Tree.
May 30, Guest speaker to be announced.

TEXAS

Medical Meetings in Houston.—The Fifth annual symposium on fundamental cancer research of the University of Texas M.D. Anderson Hospital for Cancer Research will be held at the Texas Medical Center, Houston, April 20. One half day will be devoted to papers on protein metabolism in cancer. At that time the Cancer Pathology Conference of The University of Texas Postgraduate School of Medicine will discuss breast cancer and other tumors. A region meeting of the College of American Pathologists, with coparticipation in the symposium and pathology conference, will be held. Some of the speakers will be Paul C. Aebersold, Ph.D., Oak Ridge (Tenn.) Institute of Nuclear Studies; J. J. Bittner, Ph.D., University of Minnesota Medical School, Minneapolis; Dr. Franklin W. Foote, Memorial Hospital, New York; Dr. Wilhelm C. Hueper, National Cancer Institute, Bethesda, Md.; Dr. Fred W. Stewart, Memorial Hospital, New York, and Roger J. Williams, Ph.D., The University of Texas, Houston. Dr. Stewart will deliver the second Bertner Foundation Lecture at the banquet on April 21. All meetings will be held at the Shamrock Hotel. Information may be obtained from William O. Russell, M.D., at 2310 Baldwin Street, Houston, Texas.

GENERAL

Federation of State Boards.—Dr. Walter E. Vest, Huntington, W. Va., was named president-elect of the Federation of State Medical Boards of the United States at the annual meeting in Chicago February 13. Dr. Frank J. Lawliss of Richford, Vt., was elected vice president and Dr. Walter L. Bierring of Des Moines, secretary.

Adams Memorial Number.—The January issue of the *Journal of the National Medical Association* is dedicated to the memory of Dr. Numa P. G. Adams, first Negro dean of an approved medical school, Howard University College of Medicine, Washington, D. C., on the tenth anniversary of his death. In addition to the regular articles, the issue contains a biographical sketch of Dr. Adams and his contributions to raising the standards of Negro medical education and tributes from Dr. Joseph L. Johnson, present dean of the school, and Dr. Robert A. Lambert, Greensboro, Ala., formerly associate medical director, the Rockefeller Foundation.

Influenza Viruses Identified.—The Regional Laboratory of the New York State Health Department reported to the U. S. Public Health Service, under date of February 17, three strains of influenza A′ virus isolated from recent cases in Niagara Falls, N. Y. By complement fixation tests they are closely related to the A′ strains recovered last year and less closely to FM-1 strain. M. M. Siegel, Children's Hospital, Philadelphia, reports two strains of influenza virus, presumptively A′, isolated from pooled throat washings taken from cases in Bordentown Reformatory, Bordentown, N. J. Five of seven paired serums from persons with an influenza-like disease in the region of Philadelphia have shown a significant rise in titer in the hemagglutination-inhibition test for type A virus. The Division of Preventive Medicine, Surgeon General of the Army, reports that five paired serums obtained at Biggs Air Force Base, El Paso, Texas, have shown a significant rise in the hemagglutination titer for A and A′.

International Gerontological Congress.—This congress will be held at the Hotel Jefferson, St. Louis, September 9-14 under the sponsorship of the International Association of Gerontological Societies, the Gerontological Society, Inc. and the American Geriatrics Society. Section I of the program, Biology and Medicine, is directed by John Esben Kirk, department of Gerontology, Washington University Medical School, St. Louis 9, Mo.; Section IV, Medical Services, Hygiene and Housing, Dr. Joseph W. Mountin, associate chief, Bureau of Medical Services, U. S. Public Health Service, Washington, D. C. Communications concerning papers should be sent to the director concerned. Albert I. Lansing, Ph.D., department of anatomy, Washington University Medical School, 660 South Kingshighway, St. Louis 10, is chairman of the committee on exhibits. Titles of papers with abstracts of not more than 200 words must be received by the program directors before May 1, and descriptive summaries of exhibits by Dr. Lansing, before May 1. The registration fee is $10. It is recommended that room reservations be made as soon as possible at the Jefferson Hotel, St. Louis 3.

Infectious Hepatitis.—Dr. Robert H. Hutcheson, Tennessee commissioner of health, Nashville, has reported the week of February 17 showed an increase in incidence of infectious hepatitis in Tennessee. Beginning in October 1950, small outbreaks occurred in Coffee, Franklin, Hickman, and Dickson counties. There are four definite outbreaks, the largest occurring in Knox County, where 65 cases were noted. This outbreak appears to have been waterborne. An outbreak in Sullivan County began in December 1950, and to date 26 cases have been reported. Small outbreaks are in progress in Lawrence and Sumner counties. Except for the one in Knox County, the outbreaks appear to have been respiratory-borne infections. Dr. Leroy E. Burney, Indiana health commissioner, Indianapolis, has reported an outbreak of infectious hepatitis in South Bend, Ind., and in a university hospital three nurses and one physician were ill with the disease. Dr. James O. Wails, Oklahoma Department of Health, Oklahoma City, has reported a small out-

break of acute hepatitis in a town in western Oklahoma. The nine cases were found among pupils in a consolidated school; four of the children were members of one family.

Radio Dramatization of Life of Dr. Elmer Henderson.—The radio dramatization of the life of Dr. Elmer L. Henderson of Louisville, Ky., President of the American Medical Association, will be broadcast over radio station WLS, Chicago, Tuesday, March 13, at 7:45 p. m., C.S.T. The role of Dr. Henderson will be portrayed by Herbert Rawlinson, star of stage and radio. This is one of 14 weekly radio broadcasts produced by Kiwanis International designed to illustrate the opportunities of our country's free enterprise system. The series of 15 minute dramatic sketches are being produced in Hollywood and transcriptions are available to Kiwanis clubs throughout the nation for broadcast on local radio stations. Among other Americans to be portrayed in this series are Eddie Rickenbacker, Charles E. Wilson, David Sarnoff, J. C. Penney and Louis B. Seltzer. Kiwanis clubs are sponsoring these public service programs throughout the United States, Alaska and Hawaii.

Conference on Aging.—A second symposium on "Clinical Problems of Advancing Years" will be held by Smith, Kline & French Laboratories March 15 in Town Hall, Philadelphia. Dr. Edmund V. Cowdry, St. Louis, will open the program speaking on "Work on Aging as a National Emergency." The remainder of the program is as follows:

H. Houston Merritt, New York, Convulsive Disorders in the Aged.
D. Ewen Cameron, Montreal, The Elderly Alcoholic.
Klaus R. Unna, Ph.D., Chicago, Modern Approaches to Treatment of Neuromuscular Disorders.
William Malamud, Boston, Psychiatric Problems Associated with Aging.
George W. Thorn, Boston, Studies on ACTH and Cortisone.
Paul Starr, Los Angeles, Typhoid Function and Disease in the Aged.
Willard M. Allen, St. Louis, Gynecologic Endocrinology in General Practice.
David P. Barr, New York, Relationship of Endocrine Factors to Development of Diabetes Mellitus.
Tinsley R. Harrison, Birmingham, Load and Age in Regard to Myocardial Failure.
Reginald H. Smithwick, Boston, Surgical Approach to Hypertension.
Carl A. Moyer, Dallas, Texas, Some Fluid Problems in Aged Man.
James A. Shannon, Bethesda, Md., Cardiac Failure.
Dr. Walter C. Alvarez, Chicago, The Little Strokes.

In a color television program, presented from Wills Hospital, Dr. Kendall A. Elson, Philadelphia, will speak on "The Role of Color Television in Medical Teaching." The program will feature a cataract extraction by Dr. Wilfred E. Fry, Philadelphia, and a medical clinic, "Rehabilitation of the Physically Handicapped," conducted by Dr. G. Morris Piersol, Philadelphia.

Influenza.—According to the U. S. Public Health Service, the number of cases of influenza for the week ending February 17 was 5,581, as compared with 5,243 for the same week last year. Three states in which mild respiratory infections were reported prevalent, namely Massachusetts, New York and Pennsylvania, did not report influenza. In New York State, as reported by Dr. R. M. Albrecht, Sandlake, N. Y., a disease clinically resembling influenza occurred among university students in Syracuse in December 1950. A similar outbreak in a state hospital followed, but in neither instance was influenza virus isolated. The first proven occurrence of influenza in upstate New York affected Niagara Falls and the city of Buffalo. No deaths attributed to influenza have been reported in this area. Clinical influenza has again involved Syracuse, where 250 cases were admitted to the university infirmary. A junior college in Dutchess County had 40 cases in a population of 185. A hemagglutinating agent has been isolated from cases in Niagara Falls and Syracuse, and from cases in Madison and Chenango counties. Dr. Morris Greenberg, New York City health department, reported an outbreak of a disease resembling influenza in a 5,000 bed hospital in the Bronx. About 250 cases in patients and attendants have been reported. Dr. Vlado Getting, commissioner of public health, Massachusetts, reported that upper respiratory infections causing absenteeism of 10 to 20 per cent is widespread in eastern Massachusetts. Most of the cases are stated to be mild and of short duration. Dr. W. L. Halverson, San Francisco, California director of health, states that reports of local health officers indicate that the mild upper respiratory infection is still confined to northern and central California. Specimens of blood submitted to the Regional Influenza Laboratory from a district in central California showed that A-prime influenza virus was present. Mortality reports from 106 cities in the United States showed a significant rise in number of deaths from all causes in only one area. A 7 per cent rise was reported in cities in the Middle Atlantic States for the week ended February 17, as compared with the previous week.

FOREIGN

Smallpox in Calcutta.—The Reuters News Agency reported February 26 from Calcutta that health authorities there had announced that 500 persons died of smallpox in the city during the previous week. In the preceding week 462 persons died.

CORRECTION

Change of Address.—The address of the National Society for Medical Research is 185 North Wabash, Chicago, instead of 105 North Wabash as was stated in THE JOURNAL, December 30, page 1578. The society last fall moved from 25 West Washington Street to its present address.

MEETINGS

ALABAMA, MEDICAL ASSOCIATION OF THE STATE OF, Mobile, April 19-21. Dr. Douglas L. Cannon, 519 Dexter Ave., Montgomery, Secretary.

AMERICAN ACADEMY OF GENERAL PRACTICE, San Francisco, March 19-22. Mr. Mac F. Cahal, 406 W. 34th St., Kansas City 2, Mo., Executive Secretary.

AMERICAN ACADEMY OF NEUROLOGY, Cavalier Hotel, Virginia Beach, Va., April 11-13. Dr. Joe R. Brown, Mayo Clinic, Rochester, Minn., Secretary.

AMERICAN ASSOCIATION FOR CLEFT PALATE REHABILITATION, Bellevue-Stratford Hotel, Philadelphia, April 27-28. Dr. Robert L. Harding, 813 N. Second Street, Harrisburg, Pa., Chairman.

AMERICAN ASSOCIATION FOR THORACIC SURGERY, Atlantic City, April 16-18. Dr. Brian Blades, 901 Twenty-Third St. N.W., Washington 7, D. C., Secretary.

AMERICAN ASSOCIATION OF ANATOMISTS, Detroit, March 21-23. Dr. Normand L. Hoerr, 2109 Adelbert Road, Cleveland 6, Secretary.

AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, Atlantic City, N. J., April 23-27. Dr. Frederick W. Slobe, 28 E. Jackson Blvd., Chicago 4, Managing Director.

AMERICAN ASSOCIATION OF PATHOLOGISTS AND BACTERIOLOGISTS, Cleveland, April 26-28. Dr. Alan R. Moritz, 2085 Adelbert Road, Cleveland 6, Secretary.

AMERICAN ASSOCIATION OF RAILWAY SURGEONS, Drake Hotel, Chicago, April 3-5. Dr. Chester C. Guy, 5800 Stony Island Ave., Chicago 37, Secretary.

AMERICAN COLLEGE OF PHYSICIANS, St. Louis, April 9-13. Mr. E. R. Loveland, 4200 Pine St., Philadelphia 4, Executive Secretary.

AMERICAN PEDIATRIC SOCIETY, Atlantic City, May 2-5. Dr. Henry G. Poncher, 1819 W. Polk St., Chicago 12, Secretary.

AMERICAN PHYSIOLOGICAL SOCIETY, Cleveland, April 30-May 4. Dr. R. W. Gerard, Dept. of Physiology, University of Chicago, Chicago, Secretary.

AMERICAN PSYCHOSOMATIC SOCIETY, Chalfonte-Haddon Hall, Atlantic City, N. J., April 28. Dr. Sydney G. Margolin, 714 Madison Ave., New York City 21, Secretary.

AMERICAN SOCIETY FOR CLINICAL INVESTIGATION, Steel Pier, Atlantic City, April 30. Dr. Paul B. Beeson, Grady Hospital, Atlanta 3, Ga., Secretary.

AMERICAN SOCIETY FOR EXPERIMENTAL PATHOLOGY, Cleveland, April 30-May 4. Dr. Sidney C. Madden, Brookhaven National Laboratory, Upton, L. I., New York, Secretary.

AMERICAN SOCIETY FOR PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS, Cleveland, April 28-May 4. Dr. Harvey B. Haag, Medical College of Virginia, Richmond 19, Va., Secretary.

AMERICAN SOCIETY OF BIOLOGICAL CHEMISTS, Cleveland, April 28-May 4. Dr. Elmer H. Stotz, University of Rochester School of Medicine, Rochester 7, N. Y., Secretary.

AMERICAN SURGICAL ASSOCIATION, Washington, D. C., April 11-13. Dr. Nathan A. Womack, University Hospitals, Iowa City, Secretary.

ARIZONA MEDICAL ASSOCIATION, Tucson, April 29-May 2. Dr. Frank J. Milloy, 234 North Central Ave., Phoenix, Secretary.

ARKANSAS MEDICAL SOCIETY, Little Rock, April 23-25. Dr. William R. Brooksher, 100 N. 16th St., Fort Smith, Secretary.

ASSOCIATION OF AMERICAN PHYSICIANS, Chalfonte-Haddon Hall, Atlantic City, May 1-2. Dr. Henry M. Thomas Jr., 1201 N. Calvert St., Baltimore 2, Secretary.

V 14
1951

CONFERENCE ON CHRONIC DISEASE—PREVENTIVE ASPECTS, Edgewater Beach Hotel, Chicago, March 12-14. Dr. Morton L. Levin, 535 N. Dearborn St., Chicago, Director.

CONNECTICUT STATE MEDICAL SOCIETY, Stratford, May 1-3. Dr. Creighton Barker, 160 St. Ronan St., New Haven, Secretary.

FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY, Cleveland, April 28-May 4. Dr. Milton O. Lee, 2101 Constitution Ave., Washington 25, D. C., Secretary.

FLORIDA MEDICAL ASSOCIATION, Hollywood Beach Hotel, Hollywood, April 22-25. Dr. Robert B. McIver, P. O. Box 1018, Jacksonville, Secretary.

GEORGIA, MEDICAL ASSOCIATION OF, Bon Air Hotel, Augusta, April 17-20. Dr. Edgar D. Shanks, 478 Peachtree St. N.E., Atlanta, Secretary.

HAWAII TERRITORIAL MEDICAL ASSOCIATION, Honolulu, May 3-6. Dr. I. L. Tilden, 510 S. Beretania St., Honolulu 13, Secretary.

IOWA STATE MEDICAL SOCIETY, Sioux City, April 23-26. Dr. Allan B. Phillips, 406 Sixth Ave., Des Moines 9, Secretary.

MARYLAND, MEDICAL AND CHIRURGICAL FACULTY OF THE STATE OF, Baltimore, April 24-25. Dr. George H. Yeager, 1211 Cathedral St., Baltimore 1, Secretary.

MICHIGAN POSTGRADUATE CLINICAL INSTITUTE, Book-Cadillac Hotel, Detroit, March 14-16. Dr. L. Fernald Foster, 2020 Olds Tower, Lansing 8, Secretary.

MID-CONTINENT PSYCHIATRIC ASSOCIATION, Kansas City, Mo., March 31-April 1. Dr. Paul Hines, 2625 W. Paseo, Kansas City, Mo., Secretary.

MINNESOTA STATE MEDICAL ASSOCIATION, Municipal Auditorium, Rochester, April 30-May 2. Dr. B. B. Souster, 496 Lowry Medical Arts Bldg., St. Paul 2, Secretary.

MISSOURI STATE MEDICAL ASSOCIATION, Municipal Auditorium, Kansas City, April 22-25. Dr. H. E. Petersen, 634 N. Grand Blvd., St. Louis 3, Secretary.

NATIONAL SOCIETY FOR THE PREVENTION OF BLINDNESS, Hotel New Yorker, New York, March 28-30. Dr. Franklin M. Foote, 1790 Broadway, New York 19, Executive Director.

NEBRASKA STATE MEDICAL ASSOCIATION, Paxton Hotel, Omaha, April 30-May 3. Dr. R. B. Adams, 1315 Sharp Bldg., Lincoln 8, Secretary.

NEW MEXICO MEDICAL SOCIETY, Santa Fe, May 3-5. Dr. L. G. Rice Jr., 221 West Central Ave., Albuquerque, Secretary.

NEW YORK, MEDICAL SOCIETY OF THE STATE OF, Hotel Statler, Buffalo, April 30-May 4. Dr. Walter P. Anderton, 292 Madison Ave., New York 17, Secretary.

NORTH PACIFIC SOCIETY OF NEUROLOGY AND PSYCHIATRY, Victoria, B. C., Canada, April 20-21. Dr. Gerhard B. Haugen, Mayer Bldg., Portland, Ore., Secretary.

OHIO STATE MEDICAL ASSOCIATION, Netherland Plaza Hotel, Cincinnati, April 24-26. Mr. Charles S. Nelson, 79 E. State St., Columbus 15, Executive Secretary.

SECTIONAL MEETINGS, AMERICAN COLLEGE OF SURGEONS:

New Haven, Conn., Hotel Taft, March 16-17. Dr. Gustaf E. Lindskog, 789 Howard Ave., New Haven, Chairman.

Portland, Ore., Multnomah Hotel, March 26-27. Dr. Louis P. Gambee, 833 S.W. Eleventh Ave., Portland 5, Chairman.

Denver, Colo., Cosmopolitan Hotel, April 5-7. Dr. Kenneth C. Sawyer, 1820 Gilpin St., Denver 6, Chairman.

SOCIETY FOR PEDIATRIC RESEARCH, Hotel Traymore, Atlantic City, May 2-3. Dr. Robert Ward, Bellevue Medical Center, New York 16, Secretary.

SOUTHEASTERN SURGICAL CONGRESS, Hollywood Beach Hotel, Hollywood, Fla., April 11-14. Dr. Benjamin T. Beasley, 45 Edgewood Ave. S.E., Atlanta 3, Ga., Secretary.

SOUTHERN SOCIETY OF ANESTHESIOLOGISTS, Brown Hotel, Louisville, Ky., April 20-21. Dr. John Adriani, Charity Hospital, New Orleans 12, Secretary.

SOUTHWEST ALLERGY FORUM, San Antonio, Texas, April 8-10. Dr. Boen Swinney, 224 Medical Arts Bldg., San Antonio 5, Secretary.

TENNESSEE STATE MEDICAL ASSOCIATION, Nashville, April 9-11. Mr. V. O. Foster, 706 Church St., Nashville 3, Executive Secretary.

TEXAS, STATE MEDICAL ASSOCIATION OF, Galveston, April 28-May 2. Mr. Tod Bates, 700 Guadalupe St., Austin, Executive Secretary.

UNITED STATES-MEXICO BORDER PUBLIC HEALTH ASSOCIATION, Los Angeles, April 4-6. Dr. M. F. Haralson, 314 U. S. Court House, El Paso, Texas, Secretary.

International

INTERNATIONAL CONGRESS OF GYNECOLOGY, Maison de la Chimie, Centre Marcellin, Paris, France, June 23-29. Dr. Maurice Fabre, 1, rue Jules-Lefebvre, Paris IX, General Secretary.

INTERNATIONAL CONGRESS OF MILITARY MEDICINE AND PHARMACY, Paris, France, June 17-23. Physician General Dutrey, 8, bis, rue de Recollets, Paris X, Secretary General.

INTERNATIONAL CONGRESS OF ORTHOPEDIC SURGERY AND TRAUMATOLOGY, Stockholm, Sweden, May 21-25. Sten Friberg, Karolinska Instituts Ortopediska Klinik, Stockholm, Congress Secretariat.

INTERNATIONAL EXHIBITION OF MEDICAL ARTS, Turin, Italy, May 30-June 21. Prof. S. Teneff, Palazzo della Esposizioni al Valentino, Turino, Italy.

PAN AMERICAN CONGRESS ON MEDICAL EDUCATION, Lima, Peru, May 14-18. Dr. Carlos F. Krumdieck, Washington 914, Lima, Secretary General.

EXAMINATIONS AND LICENSURE

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: *Parts I and II.* Various Centers. April 16-17 (Part II only), June 18-20, Sept. 5-7. Ex. Sec., Mr. E. S. Elwood, 225 S. 15th Street, Philadelphia.

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF ANESTHESIOLOGY: *Written.* July 20. Given simultaneously in several cities in the United States. Final date for filing application was Jan. 20. *Oral.* Coronado, Calif., April 4-7 and Memphis, Oct. 14-17. Sec., Dr. Curtiss B. Hickcox, 80 Seymour St., Hartford 15, Conn.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: *Written.* Various Centers, April 5. *Oral.* New York, June 8-10. Sec., Dr. George M. Lewis, 66 East 66th St., New York 21, N. Y.

AMERICAN BOARD OF INTERNAL MEDICINE: *Written.* Various centers, Oct. 15. Final date for filing applications is May 1. *Oral.* The schedule of oral examinations for 1951 has been arranged on a regional basis as follows: New Orleans, March 15-17 includes candidates from the following states: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee and Texas. St. Louis, April 4-6 or 5-7, covering Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota and Wisconsin. Philadelphia, June, covering Beirut, Canada, Canal Zone, Connecticut, Delaware, District of Columbia, Maryland, New Jersey, Ohio, Pennsylvania, Puerto Rico, Rhode Island, Virginia and West Virginia, New York, date to be announced, covering Maine, Massachusetts, New Hampshire, New York and Vermont. San Francisco, date to be announced, Arizona, California, Colorado, Idaho, Montana, New Mexico, Oregon, Utah and Washington.

Only candidates who have not taken an oral examination can be admitted under the schedule arranged thus far.

The final date for the filing of applications for the New Orleans and St. Louis examination was Jan. 26. The closing date for the Philadelphia examination will be March 1. Dates of closing dates for the filing of applications for examinations in New York and San Francisco to be announced.

Oral examinations in the subspecialties will be held at the same time and place and on the same distribution.

Exec. Sec., Dr. William A. Werrell, 1 West Main Street, Madison 3.

AMERICAN BOARD OF NEUROLOGICAL SURGERY: *Oral.* Chicago, May 1951. Sec., Dr. W. J. German, 789 Howard Ave., New Haven 4, Conn.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: *Oral.* New York City, May 10-16. Final date for filing application was Feb. 2. Sec., Dr. Paul Titus, 1015 Highland Building, Pittsburgh 6, Pa.

AMERICAN BOARD OF OPHTHALMOLOGY: *Oral.* San Francisco, March 11-15; New York, May 31-June 5; Chicago, October 8-13. Sec., Dr. Edwin B. Dunphy, 56 Ivie Road, Cape Cottage, Maine.

AMERICAN BOARD OF OTOLARYNGOLOGY: *Oral.* Richmond, Va., May 1-4, Chicago, Oct. 9-12. Sec., Dr. Dean M. Lierle, University Hospital, Iowa City.

AMERICAN BOARD OF PATHOLOGY: *Written and Oral. Pathological Anatomy and Clinical Pathology.* Cleveland, April 23-24. Final date for filing application is March 15. Sec., Dr. Robert A. Moore, Washington University School of Medicine, Euclid Ave. & Kingshighway, St. Louis 10.

AMERICAN BOARD OF PEDIATRICS: *Oral.* New Orleans, March 2-4; Cincinnati, March 30-April 1; Atlantic City, May 5-7. Ex. Sec., Dr. John McK. Mitchell, 6 Cushman Road, Rosemont, Pa.

AMERICAN BOARD OF PHYSICAL MEDICINE AND REHABILITATION: *Parts I and II.* Philadelphia, June 16-17. Final date for filing application is April 1. Sec., Dr. Robert L. Bennett, 30 N. Michigan Ave., Chicago.

AMERICAN BOARD OF PLASTIC SURGERY: *Oral and Written.* Chicago, June 4-6. Final date for filing application is March 15. Sec., Dr. Bradford Cannon, 330 Dartmouth St., Boston.

AMERICAN BOARD OF PREVENTIVE MEDICINE AND PUBLIC HEALTH. Biloxi, Miss., April 24-25. Sec., Dr. Ernest L. Stebbins, 615 N. Wolfe St., Baltimore.

AMERICAN BOARD OF PROCTOLOGY: *Part I in Anorectal Surgery and Proctology.* Kansas City, Minneapolis, Philadelphia and San Francisco, May 12. Sec.-Gen., Dr. Louis A. Buie, 102-110 Second Ave., S.W., Rochester, Minn.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: Philadelphia, June 11-12. Final date for filing application is March 1. Sec., Dr. Francis J. Braceland, 102-110 Second Ave., S.W., Rochester, Minn.

AMERICAN BOARD OF RADIOLOGY: *Oral.* Atlantic City, June 5-9. Sec., Dr. B. R. Kirklin, 102-110 Second Ave., S.W., Rochester, Minn.

AMERICAN BOARD OF SURGERY: *Written.* Various centers, March 1951. Final date for filing applications was Dec. 1, 1950. *Written.* Various centers, Oct. 1951. Final date for filing applications is July 1. Sec., Dr. J. Stewart Rodman, 225 South 15th Street, Philadelphia.

BOARD OF THORACIC SURGERY: *Oral.* New York City, April 19. Sec., Dr. William M. Tuttle, 1151 Taylor Ave., Detroit.

AMERICAN BOARD OF UROLOGY: Chicago, Feb. 9-13, 1952. Final date for filing applications is Sept. 1. Sec., Dr. Harry Culver, 314 Corn Exchange Bldg., Minneapolis 15.

DEATHS

Ward, George Gray ⊕ New York; born in London, England, Aug. 15, 1868; Long Island College Hospital, Brooklyn, 1891; later studied in Berlin, London and Paris; professor of obstetrics and gynecology at Cornell University Medical College from 1916 to 1934, when he became emeritus professor; served as professor of clinical obstetrics and gynecology at Columbia University College of Physicians and Surgeons and for many years as professor of gynecology at the New York Post Graduate Medical School, where he had been secretary of the faculty; member of the House of Delegates of the American Medical Association in 1922, 1924, 1925, 1935, 1937, 1939, 1940 and 1941 and chairman of the Section on Obstetrics and Gynecology, 1925-1926; fellow and past president of the American Gynecological Society; past president of the Medical Society of the County of New York and the New York Obstetrical Society; a founder and fellow of the American College of Surgeons; fellow of the New York Academy of Medicine; honorary fellow of the Edinburgh Obstetrical Society, Royal College of Obstetricians and Gynecologists and Royal Medical Society of Budapest; honorary fellow of the British College of Obstetricians and Gynecologists; member of the Phi Alpha Sigma, Alpha Omega Alpha, Military Order of Foreign Wars, Naval and Military Order of Spanish-American War; major surgeon of the twelfth regimental infantry, New York Volunteers, Spanish-American War; from 1895 to 1898 an assistant surgeon in the Twelfth Regiment of the New York National Guard with the rank of captain, and for eight years was a member of the Seventh Regiment; in 1938, after twenty years' of service as chief surgeon at the Woman's Hospital, was appointed chief surgeon emeritus and consulting surgeon; consulting gynecologist, Monmouth Memorial Hospital, Long Branch, N. J., Lawrence Hospital, Bronxville, N. Y., New York Post-Graduate Medical School and Hospital, William Booth Memorial Hospital and New York Hospital; specialist certified by the American Board of Obstetrics and Gynecology; contributor to Kelly's "Gynecology" (1928), Lewis' "Practice of Surgery" (1928), Curtis' "Obstetrics and Gynecology" (1933) and Davis' "Gynecology and Obstetrics" (1933); died December 20, aged 82.

Rosencrantz, Esther ⊕ San Francisco; born in San Francisco Nov. 18, 1876; Johns Hopkins University School of Medicine, Baltimore, 1904; interned at the New York Infirmary for Women and Children; studied tuberculosis in London, Berlin, France and Switzerland; in 1913 joined the faculty of the University of California Medical School, where she was lecturer in medical history and bibliography and where, in 1943, she retired as associate professor of medicine emeritus; specialist certified by the American Board of Internal Medicine; an Associate Fellow of the American Medical Association; fellow of the American College of Chest Physicians and the American Trudeau Society; member of the National Tuberculosis Association, California Tuberculosis Association, International Union Against Tuberculosis, American Sanatorium Association and the American Association for the Advancement of Science; member of the Red Cross Tuberculosis Commission sent to Italy, 1918-1919, and for her work was decorated by the Italian and American governments; from 1920 to 1937 in charge of the tuberculosis service at the San Francisco City and County Hospital; later was consultant to the Arequipa Sanatorium in Manor, San Luis Obispo (Calif.) County Tuberculosis Sanatorium, Hassler Health Home in Redwood City, and the tuberculosis service of the University of California Hospital and San Francisco Hospital; devoted herself to her collection of works of Sir William Osler and recently donated her library of "Osleriana" to the University of California; died in the University of California Hospital December 17, aged 74, of arteriosclerotic heart disease.

⊕ Indicates Fellow of the American Medical Association.

Peterson, Edwin ⊕ Commander, Medical Inspector, U. S. Navy, retired, Aurora, Colo.; born in Hudiksvall, Sweden, Aug. 18, 1887; University of Illinois College of Medicine, Chicago, 1915; specialist certified by the American Board of Internal Medicine; member of the American Society of Tropical Medicine and the Association of Military Surgeons of the United States; fellow of the American College of Physicians; on Nov. 26, 1917, was appointed a lieutenant (jg) in the medical corps of the U. S. Navy and served at the Naval Hospital in Great Lakes, Ill., and in the Virgin Islands during World War I; had several tours of duty in Washington: Naval Medical School in 1923, the Naval Hospital 1927 to 1931 and from June 23, 1939 to March 2, 1940, preventive medicine division, Bureau of Medicine and Surgery; retired May 1, 1941 for incapacity resulting from an incident of service; died in Denver December 2, aged 63.

White, Franklin Warren ⊕ Newton, Mass.; born in Boston Oct. 23, 1869; Harvard Medical School, Boston, 1895; served on the faculty of his alma mater; secretary of the Section on Gastro-Enterology and Proctology of the American Medical Association, 1920-1921, and chairman, 1923-1924; member of the Association of American Physicians, American Roentgen Ray Society, International Society of Gastro-Enterology, and the New England Roentgen Ray Society; past president and secretary of the American Gastro-Enterological Association; fellow and at one time regent of the American College of Physicians; specialist certified by the American Board of Internal Medicine; in 1935 appointed by the U. S. Department of State as delegate to the first International Congress of Gastro-Enterology in Brussels, Belgium; consulting physician, Boston City Hospital; died December 19, aged 81, of carcinoma.

Wilkinson, Oscar ⊕ Washington, D. C.; born in Raleigh, Miss., Aug. 31, 1870; Medical Department of Tulane University of Louisiana, New Orleans, 1896; member of the American Academy of Ophthalmology and Otolaryngology and the Southern Medical Association; fellow of the American College of Surgeons; specialist certified by the American Board of Ophthalmology and the American Board of Otolaryngology; formerly surgeon in chief of the Washington Eye and Ear Hospital; received an honorary doctor of science degree from Southwestern University in Memphis, Tenn.; author of "Strabismus: Its Etiology and Treatment" in 1928 and the revised edition in 1943, in collaboration with his son, Dr. Richard W. Wilkinson; died in Baptist Hospital, Jackson, Miss., December 16, aged 80, of cerebral hemorrhage.

Ullmann, Henry Johnson ⊕ Santa Barbara, Calif.; born in Evanston, Ill., in 1881; Rush Medical College, Chicago, 1912; specialist certified by the American Board of Radiology; member of the American Roentgen Ray Society, Radiological Society of North America, American College of Radiology and the American Radium Society, of which he was president from 1930 to 1931; fellow of the American College of Physicians; one of the original members of the Cancer Commission of the California Medical Association; member of the board of directors of the California division of the American Cancer Society since its incorporation; director of the Memorial Foundation, Santa Barbara Cottage Hospital, with which he had been affiliated since 1921; died recently, aged 69.

Shroder, Luther Null, Greenville, Ohio; University of Cincinnati College of Medicine, 1933; specialist certified by the American Board of Otolaryngology; member of the American Medical Association and the American Academy of Ophthalmology and Otolaryngology; president in 1942 and vice president in 1941 of the Darke County Medical Society; secretary of the Dayton Eye, Ear, Nose and Throat Society; served during World War II; member of the board of directors of the Citizens State Bank; on the staff of Wayne Hospital; died December 14, aged 44, of heart disease.

V 14
1951

Conger, William Henry, Poughkeepsie, N. Y.; Albany Medical College, 1908; member of the American Medical Association; for many years city health officer; on the courtesy staff of Vassar Brothers Hospital; consultant, public health, St. Francis Hospital; died December 22, aged 65, of adenoma of kidney.

Daugherty, Edwin Bertine ⊕ Marine on St. Croix, Minn.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1904; died in Lee Memorial Hospital, Fort Myers, Fla., December 21, aged 73, of pulmonary edema, congestive heart failure and coronary sclerosis.

FitzGerald, James Patrick, Winnetka, Ill.; University and Bellevue Hospital Medical College, New York, 1916; specialist certified by the American Board of Ophthalmology; at one time on the faculty of Loyola University School of Medicine in Chicago; served on the staffs of the Highland Park (Ill.) Hospital, Cook County Hospital and Henrotin Hospital, Presbyterian Hospital and St. Joseph's Hospital in Chicago, where he died December 25, aged 60, of arteriosclerotic heart disease and arteriolar nephrosclerosis.

Hall, William Joseph, Miami, Fla.; Jefferson Medical College of Philadelphia, 1896; died in Jackson Memorial Hospital December 14, aged 78.

Hapgood, Lyman Sawin ⊕ Cambridge, Mass.; Harvard Medical School, Boston, 1901; at one time on the faculty of his alma mater; an Associate Fellow of the American Medical Association; served overseas during World War I; on the staff of Mount Auburn Hospital; died December 28, aged 76, of arteriosclerosis and carcinoma of the prostate.

Harper, James Henry ⊕ Snow Hill, N. C.; Jefferson Medical College of Philadelphia, 1905; served as a member of the town board, chairman of the county board of education and chairman of the county board of commissioners; president of the Greene County Farm Bureau; a director of the Guaranty Bank and Trust Company; on the staff of Memorial General Hospital, Kinston, where he died December 17, aged 66, of coronary occlusion.

Hassall, James Charles ⊕ Oconomowoc, Wis.; Albany (N. Y.) Medical College, 1910; specialist certified by the American Board of Psychiatry and Neurology; member of the American Psychiatric Association, Association for Research in Nervous and Mental Diseases and the Central Neuropsychiatric Association; for many years medical director of Rogers Memorial Sanitarium, where he was emeritus consultant in psychiatry; died December 25, aged 63.

Heard, Joseph Eugene ⊕ Shreveport, La.; Tulane University of Louisiana School of Medicine, New Orleans, 1914; specialist certified by the American Board of Surgery; fellow of the American College of Surgeons; formerly fellow in surgery at the Mayo Foundation in Rochester, Minn.; served with the American Expeditionary Forces in France during World War I; died in North Louisiana Sanitarium, January 19, aged 62, of coronary thrombosis.

Hogan, Joseph Ambrose, Lawrence Mass.; Harvard Medical School, Boston, 1897; member of the American Medical Association; died in Lawrence General Hospital December 13, aged 78.

Hoiby, Charles Oscar ⊕ Chicago; Rush Medical College, Chicago, 1902; died December 24, aged 73, of chronic myocarditis.

Holman, Charles Henderson, Hammondsport, N. Y.; University of the City of New York Medical Department, 1886; died November 22, aged 87, of myocarditis.

Hurth, Oscar J., ⊕ Cedarburg, Wis.; born Dec. 18, 1878; Milwaukee Medical College, 1901; past president of the Washington-Ozaukee Counties Medical Society; on the staff of St. Alphonsus Hospital in Port Washington; for many years on the staff of St. Joseph's Hospital in Milwaukee; at the time of his death examining physician for the Ozaukee County draft board, a position he held during World Wars I and II; life member of the Wisconsin State Historical Society; a director of the Cedarburg State Bank; died December 28, aged 72, of cerebral hemorrhage.

Kaufman, Harry Marx, Washington, D. C.; Johns Hopkins University School of Medicine, Baltimore, 1901; member of the American Medical Association; formerly professor of clinical medicine at George Washington University School of Medicine; for many years on the staff of the Emergency Hospital where he died January 1, aged 75, of acute pulmonary edema, hypertensive coronary heart disease and diabetes mellitus.

Kell, Chance T., ⊕ Chicago; Bennett Medical College, Chicago, 1915; died December 22, aged 65, of coronary occlusion and hypertension.

Krausmann, George, Wayne, Mich.; Trinity Medical College, Toronto, Ont., Canada, 1896; formerly physician of the House of Correction in Detroit, where he was on the staff of the Providence Hospital; on the staff of the Wayne General Hospital, where he died December 21, aged 81, of arteriosclerosis.

Larkowski, Tadeusz Maryan, Chicago; Rush Medical College, Chicago, 1923; member of the American Medical Association and the International College of Surgeons; fellow of the American College of Surgeons; specialist certified by the American Board of Surgery; clinical professor of surgery at Stritch School of Medicine of Loyola University; affiliated with Cook County Hospital and St. Mary of Nazareth Hospital, where he died December 29, aged 52, of cerebral hemorrhage, hypertension and chronic nephritis.

Laughon, William I., Redondo Beach, Calif.; Medical College of Virginia, Richmond, 1917; member of the American Medical Association; served during World War I; on the staff of the Torrance (Calif.) Memorial Hospital, where he died December 25, aged 62, of lower nephron nephrosis and adrenal insufficiency.

Le Roy, Simeon ⊕ Grand Rapids, Mich.; Grand Rapids Medical College, 1898; served as county coroner; died December 24, aged 73, of cerebral thrombosis and essential hypertension.

Lisle, Howard Cochran, Springfield, Ohio; Medical Department of the University of Cincinnati, 1910; served as director of the city health department; formerly assistant superintendent of Clark County Sanatorium; died December 23, aged 75, of coronary occlusion.

Martindill, Edwin M., Chesapeake, Ohio; Medical College of Ohio, Cincinnati, 1896; served during World War I; formerly health commissioner of Lawrence County; on the staffs of St. Mary's, Memorial, and Chesapeake and Ohio hospitals in Huntington, W. Va.; died December 31, aged 76, as the result of a fall.

Moeller, Frederick William ⊕ Chicago; Northwestern University Medical School, Chicago, 1906; served during World War I and in recognition of his services in the British Army received a silver medal from the British government; one of the founders and formerly vice president of Woodlawn Hospital; died December 28, aged 72, of carcinoma of the pancreas.

Peteler, Alois, Keyport, N. J.; University College of Medicine, Richmond, 1901; died December 23, aged 74, of cardiac failure.

Petrie, Frank Branson, Woodacre, Calif.; Medical Department of the University of California, San Francisco, 1891; died December 20, aged 82, of cerebral hemorrhage.

Poulson, John Almer, Washington, D. C.; Howard University College of Medicine, Washington, 1930; died in Winchester Memorial Hospital, Winchester, Va., December 3, aged 48, of pulmonary tuberculosis.

Powell, Velura Elma ⊕ Red Oak, Iowa; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1902; owner and director of the Powell School; died in Murphy Memorial Hospital December 21, aged 76, of myocarditis.

Richards, Frederick Augustus, Sturgis, S. D.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1899; died November 29, aged 78, of carcinoma of the intestine.

Robertson, Wilburn Burdett, Burnsville, N. C.; Baltimore Medical College, 1898; died in the Rutherford (N. C.) Hospital January 6, aged 76, of carcinoma.

Roop, William O., Absecon, N. J.; University of Maryland School of Medicine, Baltimore, 1907; specialist certified by the American Board of Dermatology and Syphilology; formerly practiced in Atlantic City, where he was on the staff of Atlantic City Hospital; died December 27, aged 71, of cerebral hemorrhage.

Ryan, John Maxwell, Carrollton, Ky.; University of Louisville (Ky.) School of Medicine, 1917; member of the American Medical Association; in 1946 received the Citizenship Award for the year 1945 from the Carrollton Chamber of Commerce in recognition of most valuable service rendered to the community during the year; died December 17, aged 58, of coronary occlusion.

Salter, John Cleveland ✠ St. Louis; Johns Hopkins University School of Medicine, Baltimore, 1901; served as chief medical examiner for many insurance companies; died in St. Luke's Hospital December 21, aged 77, of nephrosclerosis.

Scott, Frederick Wilson ✠ New Brunswick, N. J.; Columbia University College of Physicians and Surgeons, New York, 1911; died in St. Peter's Hospital December 27, aged 65, of carcinoma.

Seegman, Simon ✠ Cresson, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1902; specialist certified by the American Board of Otolaryngology; served as examiner for the local draft board during World War II; formerly on the staff of Montefiore Hospital in Pittsburgh; on the staff of the Pennsylvania State Tuberculosis Sanatorium; died November 6, aged 68.

Seidner, Maurice L., Chicago; Jenner Medical College, Chicago, 1917; died January 1, aged 64, of chronic myocarditis.

Selfridge, Grant L., San Francisco; Hahnemann Medical College and Hospital of Philadelphia, 1889; specialist certified by the American Board of Otolaryngology; member of the American Academy of Ophthalmology and Otolaryngology and the American Laryngological, Rhinological and Otological Society; died in St. Francis Hospital, January 1, aged 87, of cerebral hemorrhage.

Severson, Selena, Madison, Wis.; Northwestern University Woman's Medical School, Chicago, 1895; died December 13, aged 89.

Sheldon, Ralph ✠ Lyons, N. Y.; Albany Medical College, 1894; for many years health officer and school physician; died in Edward J. Barber Hospital November 23, aged 80, of heart disease.

Shepard, Chester Orville ✠ Independence, Kan.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1912; for many years county coroner; on the staff of Mercy Hospital; died November 8, aged 63, of coronary occlusion.

Simonds, Grant H., Medina, N. Y.; University of Buffalo School of Medicine, 1888; also a dentist; died December 21, aged 85.

Slivka, John, Cleveland; Chicago College of Medicine and Surgery, 1916; died December 30, aged 61.

Smith, Alfred Goldsmith, New York; Medizinische Fakultät der Universität, Wien, Austria, 1906; resident at Home for Dependents, Welfare Island; died December 15, aged 72.

Smith, Benjamin Hall, Temple City, Calif.; Missouri Medical College, St. Louis, 1889; member of the American Medical Association; died in the Hospital of the Good Samaritan, Los Angeles, December 13, aged 82.

Smith, Hewitt M., ✠ Lansing, Mich.; University of Michigan Medical School, Ann Arbor, 1924; president of the Ingham County Medical Society in 1942; died in St. Lawrence Hospital December 30, aged 54, of jaundice, stricture of the common duct and acute renal failure.

Somma, Richard Edgard ✠ Chicago; Rush Medical College, Chicago, 1937; died January 12, aged 46, of coronary thrombosis and arteriosclerosis.

Sterner, Otto W., St. Paul; University of Minnesota College of Medicine and Surgery, Minneapolis, 1903; member of the American Medical Association; died December 7, aged 72.

Stuart, LeClare, Rome, N. Y.; College of Physicians and Surgeons, Baltimore, 1908; member of the American Medical Association; served during World War I; affiliated with Rome Hospital, of which he had been president; died in Loudoun County Hospital, Leesburg, Va., December 22, aged 67, of injuries received in an automobile accident.

Swaney, Matthew A., Falls Creek, Pa.; Starling Medical College, Columbus, 1903; on the school board; member of the American Trudeau Society; affiliated with Maple Avenue Hospital, DuBois, where he died January 2, aged 73, of coronary occlusion.

Tennant, Lewis Whitman, Fort Wayne, Ind.; Medical College of Indiana, Indianapolis, 1904; member of the American Medical Association; died in Lutheran Hospital December 17, aged 79, of coronary occlusion.

Titsworth, Guy, Sedalia, Mo.; St. Louis University School of Medicine, 1904; member of the American Medical Association; served overseas during World War I; died in the Veterans Administration Center, Wadsworth, December 13, aged 73, of cerebral hemorrhage.

Weiss, Dora K., New York; Ludwig-Maximilians-Universität Medizinische Fakultät, München, Bavaria, Germany, 1922; member of the American Medical Association and American Society of Anesthesiologists; affiliated with Beekman-Downtown Hospital, where she died recently, aged 60, of arteriosclerotic heart disease and diabetes mellitus.

White, Ernest Edward, Leavenworth, Kan.; Drake University Medical Department, Des Moines, 1896; served during World War I; for many years affiliated with the Veterans Administration; died in the Veterans Administration Center, Wadsworth, December 7, aged 78, of arteriosclerosis, and diabetes mellitus.

Wible, Elmer E., Karns City, Pa. Western Pennsylvania Medical College, Pittsburgh, 1891; specialist certified by the American Board of Ophthalmology; member of the American Medical Association; at one time deputy coroner of Westmoreland County; formerly affiliated with the Homestead (Pa.) Hospital; died November 20, aged 83, of multiple cerebral thrombosis.

Wilkerson, James Herbert, Baltimore; University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore, 1921; member of the American Medical Association; formerly on the faculty of his alma mater; staff member of Maryland General, South Baltimore General and Bon Secours hospitals; on the visiting staffs of University and St. Agnes hospitals; served as surgeon for the boxing commission; died December 22, aged 53, of heart disease.

Williams, James Owen ✠ Alderson, W. Va.; College of Physicians and Surgeons, Baltimore, 1914; died in a hospital at Clifton Forge, Va., December 4, aged 67, of cerebral hemorrhage.

Winnett, Edwin Basont ✠ Des Moines; Drake University Medical Department, Des Moines, 1912; also a graduate in pharmacy; specialist certified by the American Board of Internal Medicine; fellow of the American College of Physicians: affiliated with Iowa Methodist, Lutheran, Broadlawns and Mercy hospitals; died December 8, aged 66, of heart failure.

Wolverton, Orlando Price, Greenville, Ohio; Medical College of Ohio, Cincinnati, 1894; served on the staff of Wayne Hospital, where he died December 6, aged 78, of carcinoma of the jaw.

Yarbrough, John Fletcher, Montgomery, Ala.; Atlanta Medical College, 1892; member of the American Medical Association; affiliated with Hubbard Hospital, where he died recently, aged 86, of pneumonia.

V 14
1951

GOVERNMENT SERVICES

ARMY

Translators Wanted.—The Office of the Surgeon General of the Army has several civilian positions available for medically trained personnel who can read foreign languages, to compile information from foreign medical and other literature. Applicants must be American citizens. Those interested should communicate with the Office of the Surgeon General, U. S. Army, Attention: Civilian Personnel Branch, Washington 25, D. C.

New Joint Medical Office.—The Surgeons General of the Army, Navy and Air Force have appointed their full time representatives to the Armed Services Medical Regulating Office. ASMRO, as it is known, will regulate the flow of military patients into and within the United States, determine which military hospital closest to the patient's home can best provide care required for each patient and control the transfer of patients to hospitals. Until now this function has been performed by each service independently, with only informal liaison. The evacuation of military patients to all military hospitals in the continental United States will be greatly facilitated through the establishment of joint procedures governing patient flow. ASMRO is located in the Office of the Army Surgeon General.

VETERANS ADMINISTRATION

Prescriptions for Veterans.—Under agreements between VA and state pharmaceutical associations in 45 states, the District of Columbia and Hawaii, private pharmacists have been authorized to fill prescriptions, at government expense, for veterans undergoing outpatient treatment for service-connected ailments in VA clinics or with private physicians. The nation's retail pharmacists filled 736,000 prescriptions for veterans under the Veterans Administration "home town" pharmacy program during calendar year 1950, E. Burns Geiger, chief of VA's pharmacy division, has announced.

In addition to prescriptions compounded by private druggists during 1950, a total of 3,397,000 were filled in VA hospitals and centers and another 1,204,000 were filled in VA regional offices. These two totals, aggregating 4,601,000, represent a 125,000 increase over the prescriptions filled by VA pharmacists during 1949.

New hospitals with a total bed capacity of 7,954 beds were opened during 1950, each containing a modern hospital pharmacy employing one to four registered pharmacists. Also, during 1950, a VA Formulary was completed and will be distributed throughout the Veterans Administration in the near future.

VA to Hospitalize Certain Military Personnel.—The Department of Defense and the Veterans Administration have announced plans to hospitalize certain disabled military personnel in VA hospitals for specialized medical care, including rehabilitation on the same basis as other veterans with service-connected disabilities. The military patients to be hospitalized by VA are those whose disabilities make it improbable that they will return to active duty. The transfer policy will not preclude the return to duty of any patient who, after medical treatment and rehabilitation, desires to return to active duty and is acceptable to the armed forces. The basic consideration in transfers will be the welfare of the patient, and each case must be considered on an individual basis.

The military patients to be transferred under the plan would have become eligible for VA hospitalization as soon as they were separated from the service. The new plan merely speeds their transfer and reduces the over-all national demand for critical medical personnel by caring for patients in one organization instead of having the VA, the Army, the Navy and the Air Forces duplicating personnel and facilities.

The types of cases considered eligible for transfer are as follows: severe injuries to the nervous system; including quadriplegics, hemiplegics, paraplegics; the blind and the deaf requiring definitive rehabilitation; major amputees; neurological disabilities, including poliomyelitis with disability residuals and degenerative diseases of the nervous system; patients requiring extensive plastic surgical procedures and those also requiring extensive thoracic surgical procedures. In addition to these categories, the tuberculous and the neuropsychiatric patients, especially the psychotic, are recognized to be the largest group that will require specialized service in the Veterans Administration. The plan will preserve the continuity of the VA's present hospital organization and assure adequate care of veterans even after the present emergency is terminated.

The Veterans Administration said that the plan, which is already in effect in a limited way, will be expanded gradually as military patients are transferred to VA hospitals for this specialized care and rehabilitation. VA said the program will not mean a permanent reduction in the number of beds available to veterans.

Home Nursing Care for Veterans.—The Veterans Administration has signed contracts with 226 community nursing agencies in all parts of the United States to put its part time home nursing care program on a national basis. Expansion of the program, which was launched on a six month trial basis in the New England states, will enable VA to give high quality medical care to veterans with service-connected injuries or illnesses who can be treated in their own homes under the home town medical care program. Inauguration of the home nursing program on a national basis is expected to free beds in VA hospitals now occupied by patients with conditions not requiring constant attention by doctors and nurses. The VA pilot program in New England, which provided contracts with 163 community nursing agencies, was begun in April 1949 and was successful from the start. In the six month trial, nearly 1,200 home visits were made. The cost was only a fraction of the cost of keeping the patient in the hospital. Some patients required almost daily visits; others were visited twice a week and some weekly. Two patients required visits twice daily. Visiting nurses bathed the patients; gave them medication, physical therapy, discussed diets with patients and their families, instructed them in health and hygiene and provided general nursing care.

The ailments ranged from amputations to duodenal and gastric ulcers. Most numerous were patients afflicted with multiple sclerosis, paraplegia and tuberculosis.

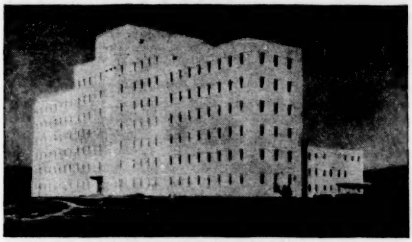
VA said home nursing care at all times must be given under the direction of a fee-basis physician, Regional Office physician or, in the case of a patient on leave from a VA hospital, by a physician on the hospital staff. Community nursing organizations must meet minimum membership requirements of the National Organization for Public Health Nursing to qualify for contractual participation in the VA program.

Private or fee-basis physicians treating VA patients under the home town medical care program are authorized to request home nursing care for patients from agencies under contract with VA, but such requests must receive prior approval of the VA Regional Office. In emergencies, telephone or telegraph requests may be made by the physician, with a written request following within 15 days.

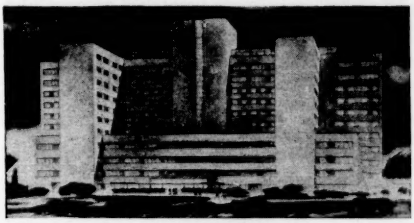
Wanted—Residents in Psychiatry.—The VA Hospital, Dearborn, Mich., a 972 bed general medical and surgical hospital, with 89 psychiatric and neurologic beds, has openings for several residents in psychiatry. This residency training program is under the supervision of the Deans Committee of the Wayne University College of Medicine and includes affiliated training at the Wayne County General Hospital and Receiving Hospital in Detroit. Inquiries may be directed to the Manager, Veterans Administration Hospital, Dearborn, Mich.

NEW VETERANS HOSPITALS COMPLETED LAST YEAR

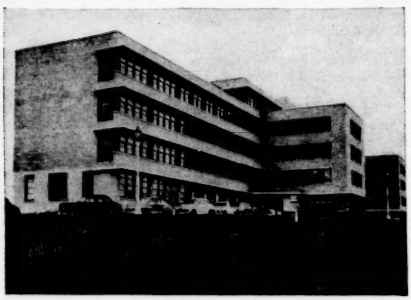
The veterans hospitals illustrated on this and the following page were completed approximately during the calendar year 1950. The Veterans Administration, as of January 31, 1951, had a total of 147 hospitals in operation, 27 hospitals listed as "construction completed," 31 hospitals under construction and eight new hospitals in the planning stage. In addition there were 16 domiciliary units in operation; construction had been completed on additions to 37 existing hospitals, four such additions were under construction and two more were in the planning stage. The total bed capacity of the 147 hospitals in operation was 114,256. Of these hospitals 34 are military and other hospitals transferred to VA. Four of the 34 are operated as annexes to permanent VA hospitals and are not counted as separate hospitals.



MINOT, NORTH DAKOTA



OMAHA, NEBRASKA

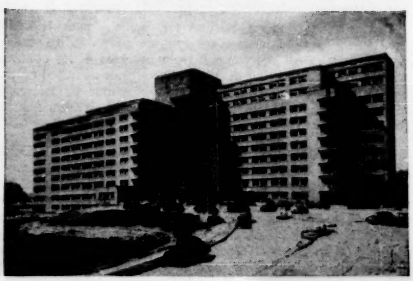


FORT WAYNE, INDIANA

MANCHESTER, NEW HAMPSHIRE

BIG SPRING, TEXAS

WILKES-BARRE, PENNSYLVANIA



SHREVEPORT, LOUISIANA

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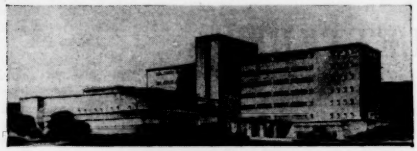


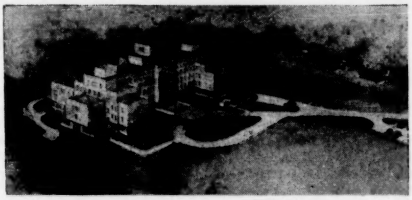
ALTOONA, PENNSYLVANIA

BUFFALO, NEW YORK

POPLAR BLUFF, MISSOURI

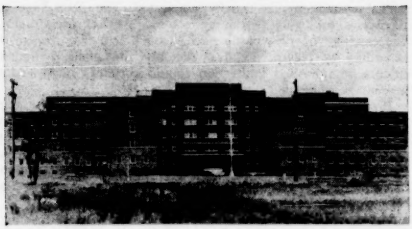
CLARKSBURG, WEST VIRGINIA

MONTROSE, NEW YORK

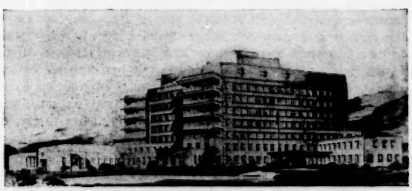


BECKLEY, WEST VIRGINIA

GRAND ISLAND, NEBRASKA



MARLIN, TEXAS



SPOKANE, WASHINGTON

LITTLE ROCK, ARKANSAS

FOREIGN LETTERS

ITALY

Congress of Urology.—The Italian Society of Urology held its twenty-third National Congress in Palermo. Surgical therapy of the malignant tumors of the bladder was discussed by Professors Ravasini of Padua and Nicolich of Genoa, while Professor Bruni of the University of Naples reported on contact roentgenotherapy of such tumors.

Professor Ravasini stressed the importance of determining as accurately as possible the clinical and anatomicopathological aspects of vesical tumors.

The most important factors are the macroscopic and histopathological characteristics of the tumor and the presence or absence of parietal infiltration. These should constitute the basis for a uniform surgical classification of vesical tumors.

The speaker stressed that, among the various surgical technics, total cystectomy is of value. In some types of malignant tumors, it is difficult to decide which method permits radical removal of the tumor with the least possible risk and the least possible crippling. The speaker suggested that it might be advisable to extend the indications for total cystectomy to include cases in which a more conservative operation, such as partial cystectomy, is usually advocated. The percentage of recoveries following partial cystectomy are not encouraging; one case out of 12 according to Nicolich and four out of 18 according to Negro. Total cystectomy for small malignant tumors with limited infiltration should certainly increase the percentage of permanent recoveries.

Prof. Nicolich referred briefly to the etiology of malignant tumors of the bladder. This is at present almost completely unknown, except that derivatives of aniline and infection by Schistosoma haematobium have been acknowledged as causal factors in some cases. He considered Hückel's classification, based on macroscopic and microscopic characteristics of the tumors, to be the most exhaustive.

Differentiation between so-called benign tumors and malignant tumors, especially atypical capillary fibroepitheliomas (malignant papillomas) and papillary carcinomas, is difficult. Malignant degeneration of the fibroepitheliomas with benign histological and clinical characteristics is frequent. Concerning the clinical diagnosis, Nicolich ascribed particular importance to data furnished by cystoscopy and by roentgenologic examination (intravenous urography and simple or combined cystography). He considers biopsy and bimanual exploration to be of minor importance. In many cases, clinical diagnosis can be made only by exploratory laparotomy or, more rarely, by exploratory cystoscopy. Malignancy of a tumor is often revealed by its resistance to endoscopic electrodesiccation. In the opinion of the speaker, endoscopic electrodesiccation is indicated for capillary fibroepithelial tumors of medium size and of limited number. In diffuse papillomatosis, he believes that total cystectomy is advisable. In papillary carcinoma with limited parietal infiltration, he performs extirpation with resection of the vesical wall. In carcinoma of considerable size and with deep infiltration, in sarcoma and in adenocarcinoma, he believes that total prostatocystovesiculectomy or pancystectomy with implantation of the ureters into the intestines is indicated.

In evaluating the various therapeutic procedures, Professor Nicolich examined the results of several authors as well as his own which include 165 endoscopic electrodesiccations, 48 transvesical extirpations, 45 extirpations with resection, 37 ureterosigmoidostomies, and 20 total cystectomies. The more important conclusions reached by the speaker were that fibroepithelial tumors, adenomas and mesodermic tumors are, in general, curable with a conservative operation while only in diffuse papillomatosis is total cystectomy indicated. In isolated papillary carcinomas with limited spread, indications vary according to the viewpoint of the urologist; the speaker was generally in favor of conservative intervention. In infiltrating papillary carcinoma, in adenocarcinoma and in sarcoma, the only therapy is total cystectomy and transvesical radium therapy. Nicolich prefers total cystectomy or pancystectomy, but late results are not satisfactory and the percentage of recoveries does not exceed 10 to 15 per cent.

Professor Bruni, in his report on contact roentgen therapy, discussed the practical application of the method and its indication. He mentioned results of his 10 years' experience at the Institute for the Study and Treatment of Tumors. With regard to the indications, it was concluded that this technic may be useful in (1) pedunculated neoplasms for which surgical excision is considered advisable, (2) sessile neoplasms involving the posterior wall of the bladder with limited superficial extension and depth and (3) neoplasms similar in type to the preceding ones but in which a complete surgical extirpation can be combined with contact roentgen treatment of the adjacent tissues. Immediate results have been gratifying and late results satisfactory. The first patients treated have remained cured for about 10 years, and the percentage of permanent recovery in malignant cases is about 60 per cent. There have been no operative deaths.

BELGIUM

Hepatic Amebiasis in the Belgian Congo.—Lambillon and Beheyt, of the hospital for natives at Léopoldville, presented to the Belgian Society of Tropical Medicine data on hepatic amebiasis. Observations covered 141 cases from the Kivu and Léopoldville regions. The incidence was higher in men than in women and higher among adults than among children. The principal symptoms that lead to the diagnosis of hepatic amebiasis among the natives and certain characteristics that the disease assumes among Europeans were stressed. Surgical treatment consists in adequate drainage. Medical therapy consists in small, daily doses of emetine hydrochloride (not more than 40 mg.) combined with arsenic and penicillin and with adjuvant treatment of the myocardium. A total dose of 500 mg. of emetine hydrochloride was never exceeded. It was necessary to repeat the courses of emetine therapy in most cases.

Continuous Aspiration and Gastroduodenal Perforation.—Swynghedauw and LeGrand of Lille contribute something new concerning this important problem in the *Acta Chirurgica Belgica*. They did not formulate an absolute rule but emphasized the advantages of Taylor's method, which permits counteracting the shock condition in the patient so that subsequent operation will then be easier and more certain. They point out the indispensability of early roentgenography, immediate aspiration and treatment of shock. The authors, aided by spontaneous pneumoperitoneum, punctured the peritoneal cavity and aspirated fluid for bacteriologic examination. Then, intraperitoneal injections of procaine hydrochloride, followed by penicillin (500,000 units), were given. The patients were immediately put to bed, and continuous duodenal aspiration was started with the aid of gastrodiaphany and a small electric aspirator. Blood plasma or polyvinyl pyrrolidone were given and, when indicated, cardiac drugs, ice on the abdomen and other such measures. Suction was then maintained until the pain completely disappeared (an average of 24 to 36 hours). Quantities of fluid varying from 2 to 2.5 liters were given. The patients were in excellent condition on the second day following treatment; beginning with the third day, liquid diet could be started. Aspiration was interrupted from time to time. The patients were then prepared for gastrectomy, which was performed after intervals varying from the fifth to the twentieth day, depending on the patient's condition. It seems that the optimum time for the operation was about the fifteenth day after perforation.

The items in these letters are contributed by regular correspondents in the various foreign countries.

V 14
1951

Intestinal Obstruction.—Works by Danis, Boulvin, Decoulx and other workers, recently published in Belgium in both the *Scalpel* and *Acta Chirurgica Belgica*, contribute observations on intestinal obstruction. Danis thinks that the theories on the pathogenesis of intestinal obstruction have undergone evolution comparable to that which has taken place with respect to the pathogenesis of burns. It has become evident that the local lesion causing the obstruction does not constitute the entire disease. Most often, it is part of an ileus, a general disease of the humoral type which often requires more urgent treatment than the local obstruction. It may be dangerous to operate on an obstruction without having first treated the ileus by all available medical means. In this way, the patient is prepared to withstand surgical shock. A subsequent operation is indicated in cases in which the mechanical obstruction cannot be overcome by Wangensteen's duodenal-jejunal suction. The degree of urgency, dependent on whether strangulation is narrow, or hernia, volvulus or adhesions are present, cannot be ascertained until some time after the appearance of the first clinical signs. Ultimately, the degree of urgency is based on the white blood cell count. This, together with the symptomatic picture of the ileus but independent of the changes in pulse, temperature, arterial pressure, number of blood corpuscles, chloride and urea contents and even of intestinal distension, reveals almost without a doubt either the presence or absence of intestinal infarct. This test seems accurate enough to serve as a guide for treatment. Preliminary medical treatment is not dangerous if the leukocyte count is moderate and does not increase. As soon as the leukocyte count reaches or exceeds 15,000, surgical treatment is urgent, if the patient's general condition permits.

Intestinal aspiration, indicated in obstruction, is, according to Decoulx, contraindicated in strangulation. It is necessary to operate immediately in more than half the cases, with intestinal aspiration being instituted after operation. Aspiration may be considered in the other cases, with the reservation that, if aspiration fails after a six hour period of trial, operative intervention should be undertaken without delay. It is not yet possible to give a systematic rule to be followed if effects of aspiration are favorable. However, aside from the early paralytic or inflammatory postoperative occlusion, in which aspiration is in itself adequate and thus eliminates the need for operation, all patients must sooner or later be subjected to surgical treatment.

Boulvin reports data on 136 cases. Howet, from experimental studies on the physical pathology of the obstruction, believes that arrest of the passage of fluids and gases determines the progressive distension of the loops above the obstruction. This distension progresses rapidly and practically abolishes their capacity of resorption. In addition, eccentric compression of the wall of the small intestine causes (as a result of the vasoconstriction reflex), a condition of anoxic stasis. This stasis causes a change of the permeability of the vascular endothelium and of the mucosa itself, a change that causes edematous infiltration of the wall of the intestine and increases transudation into the intestinal lumen. Thus the obstructing mass initially caused by the diminution of the resorbant surface progressively increases, ending in death. The pathogenesis of the intestinal obstruction in the rabbit apparently does not entail any toxemic factor. The pathogenesis of the paralytic ileus is explained in the following way: There is an arrest of the peristaltic contractions secondary to the direct traumatic or reflex inhibition of the intramural nerve plexus and, also, a change of the resorptive function of the intestinal mucosa. This change is caused by the decrease of the circulation of the intestinal mucosa, determined by a reflex vasoconstriction caused by the trauma.

Bottin believes that the primary cause of severe symptoms and of death from the obstruction of the upper part of the intestine is an intoxication whose primary origin is in the pancreas. In certain cases, changes are found in the pancreas, principally necrosis of the parenchymatous cells. Another important factor which allows this intoxication of pancreatic origin to cause all these fatal effects, must intervene, that is, the dehydration which is accompanied by a certain amount of demineralization.

TURKEY

BCG Immunization.—Since 1934 the Refik Saydam Central Institute of Hygiene in Ankara has prepared BCG vaccine and has made it available to physicians free of charge. The fresh vaccine used to be given by mouth to the newborn of tuberculous families in urban communities. In recent years the Ministry of Health and Social Assistance has sent three microbiologists to Denmark to observe the tuberculosis campaign, the preparation of BCG vaccine, mass chest examination and methods of immunization. Dr. Niyazi Musa Erzin, director of the Central Institute of Hygiene, Ankara, who in 1949 spent some time in Denmark to investigate BCG activities, established a new laboratory with latest equipment for the preparation of BCG vaccine in a separate building on the grounds of the institute. Last November the new laboratory was opened by the president of Turkey, Celal Bayar, the present and former ministers of health and leaders of the tuberculosis campaign movement. At present BCG immunization is being administered in Istanbul, Ankara and Izmir.

TABLE 1.—*Tuberculosis Death Rate per 100,000 for Istanbul (Population 1,001,002)*

Year	Deaths from All Forms of TB	Deaths from Pulmonary TB
1934	250	205
1935	237	198
1936	230	188
1937	234	191
1938	220	181
1939	225	186
1940	231	187
1941	243	199
1942	318	259
1943	328	266
1944	310	253
1945	313	249

TABLE 2.—*Deaths from Pulmonary Tuberulosis (1934-1945)*

Age Group, Yr.	Deaths, %	Age Group, Yr.	Deaths, %
0-1	0.5	35-44	11.7
1-4	1.0	45-54	13.4
5-14	3.3	55-64	8.6
15-24	31.7	65-above	4.0
25-34	25.4		

The city's general death percentages according to the same age groups in table 2 are respectively: 12.2, 5.8, 3.2, 9.1, 8.1, 8.0, 10.5, 16.5 and 27.7.

TABLE 3.—*Negative Tuberculin Reactions*

Age Group, Yr.	Negative Results, %	Age Group, Yr.	Negative Results, %
0-1	79.3	35-44	6.3
1-4	71.2	45-54	4.2
5-14	51.8	55-64	5.2
15-24	19.1	65-above	4.0
25-34	7.9		

TABLE 4.—*Distribution of Negative Results in Workers in Various Industries*

Age Group, Yr.	Tobacco, %	Textiles, %	Cellulose, %
15-19	18.0	23.1	27.1
20-24	7.3	6.5	16.2
25-29	2.9	4.6	10.8
30-34	1.4	3.8	6.7
35-39	1.0	2.8	4.4
40-44	0.5	2.4	4.5
45-50	0.6	1.6	2.7

Unfavorable housing and food conditions during and after the war raised the tuberculosis death rate from 218 per 100,000 to 267 and the general death rate from 12.7 to 18.9 per cent. After his investigations in Denmark microbiologist Dr. O. Nureddin Onur, director of the Istanbul Institute of Hygiene, or-

ganized BCG immunization in that city. At the fourth Turkish Microbiology Congress, held at Ankara Oct. 17-19, 1950, Dr. Nureddin Onur reported on the 1949-1950 activities. His statistics are shown in the tables.

Dr. Nureddin Onur and his associates established BCG stations and administered the fresh vaccine prepared at the Refik Saydam Institute of Hygiene using the v.Pirquet cutaneous method and checking the negative results with the Mantoux intradermal reaction. Results of the tests were recorded after 48 hours, and in doubtful cases, again after 72 hours; an infiltration zone of 5 mm. in diameter indicated a positive cutaneous reaction to the v.Pirquet test and an 8 mm. infiltration zone indicated a positive reaction to the Mantoux test. The tests were individually appraised. A strict mathematical standard was not adhered to; the pathogenic importance of the infiltration reaction was evaluated. A 4.5 mm. infiltration zone was not considered negative, and temporary and true allergies were taken into consideration. Among the thousands of persons vaccinated, only one, a woman, developed a Schönlein-Henoch purpura of the whole body, the day after the test. Recurrent reactions have been observed in 11 persons.

Of the 24,105 persons given the BCG test 9,354 were grade school children, 4,341 adults and 10,510 workers.

Table 5 indicates the importance of prophylaxis in grade school children.

TABLE 5.—*Negative Results in Children 6-13 Years*

Age, Yr.	Negative Results, %	Age, Yr.	Negative Results, %
6	60.0	10	49.5
7	59.6	11	47.5
8	56.5	12	44.8
9	52.1	13	41.1

When immunization of grade school children was done with an intradermal injection containing 0.025 mg. of BCG, 78 to 82 per cent had a positive tuberculin reaction eight or nine weeks after vaccination. The low rate of conversion was due to a 50 per cent decrease in active germs. Therefore, the BCG dose was raised to 0.2 mg., which resulted in a conversion rate of 86.5 per cent.

SWEDEN

Postgraduate Training and Refresher Courses.—At a recent inter-Scandinavian meeting, the representatives of Sweden, including Dr. B. v. Friesen, Dr. W. Rasch and Dr. D. Knutson, reviewed the present position with regard to postgraduate training in this country, where a clear distinction is made between the complementary hospital training of young graduates and the refresher courses for older practicing physicians. Between 1926 and 1940 only about 5 per cent of the general practitioners had had less than a year of hospital training after graduation. It may seem curious to outsiders that, while postgraduate training of young doctors is largely in the hands of the Swedish Medical Association, which regulates the conditions under which doctors qualify as specialists, the organization of refresher courses is a matter in which the state has begun to take some interest. The Swedish Medical Association and the state do not always see eye to eye in matters of general policy in medical matters, and the representatives of the former, such as Dr. Knutson, complain that the state does not appreciate general practitioners as it should. It is inclined, in his opinion, to put its faith in the large polyclinics, which are designed to relieve pressure on hospitals for inpatients and general practitioners of some of their responsibilities. To counteract this tendency, Dr. Knutson urges the general practitioner to justify his existence and demonstrate his usefulness to the community by the high standard of his work.

The refresher courses already provided in Stockholm and Gothenburg are administered and financed by the state. Private practitioners, as well as medical officers of health, are free to attend. The knowledge thus gained can, of course, be supplemented by the study of medical publications, including those financed by pharmaceutical and other industrial concerns, though in the latter case the reader should be especially critical of the literature. It has been suggested that general practice should be treated as a specialty in itself, with the rights and privileges attached to other specialties, such as surgery. According to this idea, concerning which definite plans have already been formulated, the general practitioner wishing to rank as a specialist must have had a five year training period during which there are available to him facilities for study of specialties such as surgery, tuberculosis and psychiatry.

Abuse of Radiologic and Other Tests.—Complaints in the Scandinavian medical press of the misuse of laboratory tests, radiologic tests in particular, have of late been voiced by clinicians with greater faith in the exercise of their five senses than in the reports of technicians. Dr. Lennart Norrlin of Stockholm is critical of radiologic tests that may delay operative treatment of a perforated gastric or duodenal ulcer. He has known the reports of radiologists to lead to exploratory laparotomies in cases in which any surgical intervention would obviously be fruitless. He refers in more general terms and in no complimentary sense to the hospital chiefs who delay by several days their first visit to a new patient until they have been equipped with a whole sheaf of laboratory reports. He suggests that the younger generation have become the slaves of the laboratories, which were originally intended to serve merely as auxiliaries. Dr. Ole Jacob Broch of the Rikshospital in Norway has much the same criticism. He extends it to a wider field, including the electrocardiogram and even Ewald's test meal, which he says may show in the same patient achylia one day and hyperacidity the next.

Neglect of Breast Feeding.—A recent exchange of views on this subject in the medical press has yielded some instructive data. In Kiruna C (population about 10,000) Dr. Sixten Haraldson has questioned mothers attending a child welfare center on the subject of breast feeding. He found that it was most neglected by young primiparas and most faithfully practiced by multiparas between the ages of 26 and 30. It seemed to him that neglect of this practice depended chiefly on faulty appreciation on the mother's part of the importance of breast feeding to her child. In a series of consecutive cases in which the infants were more than 6 months old, he found that only every third infant had enjoyed full breast feeding for six months and only every fifth infant had done so when the mother was a primipara under the age of 26. Commenting on these findings, Dr. Vera Starck-Romanus suggests that the comparative failure of young primiparas in this respect is largely due to ignorance of the technic of breast feeding and, perhaps, to lack of faith in their own capacity to suckle their infants. She points out that infants have two parents and that breast feeding might be more in use if the father recognized that he must take an active part in washing and dressing his offspring. She refers in this connection to the much appreciated courses in infant welfare organized in Stockholm for the benefit of father.

Death of Karl Edvard Hällsjö.—A remarkable figure and landmark in the world of medicine, archeology and social reform, Dr. Karl Edvard Hällsjö, died on Nov. 29, 1950, at the age of 84, of cancer of the stomach. He came from a working class home. Soon after qualifying as a doctor, in 1900, his services were secured by an important industrial concern, the Kopparbergsbolag. The company was generous, and the cooperation between employer and employee yielded many fruitful reforms. Schools and hospitals and model houses sprang up under the doctor's guidance, and the company's employees found in him a liberal and far-seeing interpreter of their needs.

Dr. Hällsjö's sympathies extended far beyond the fields of preventive and clinical medicine. His interest in history and archeology made him a tireless explorer of excavations in Swedish soil. He found old buildings of historical interest, and, by bringing a score of such buildings into one place, he created a village museum. He attended book auctions, buying books by the sack for a trifle. In due course his judiciously collected library came to consist of more than 10,000 volumes, now in the possession of a public library. The honors bestowed on Dr. Hällsjö included a doctorate of philosophy, honoris causa, at the University of Uppsala.

V 14
1951

BRAZIL

Orthopedic Congress.—The Ninth Congress of the Sociedade Brasileira de Ortopedia e Traumatologia was held in São Paulo, at the Hospital Santa Casa, under the presidency of Dr. Renato da Costa Bomfim. The guests of honor were Dr. H. W. Meyerding, from the Mayo Clinic, Rochester, Minn.; Dr. Julius Hass, former professor in Vienna; Dr. J. Valls, Buenos Aires, and Dr. J. L. Bado from Montevideo. In addition to the scientific program, the congress included scientific and technical exhibits, in which were represented Brazilian, American, English, Swedish, Italian and German firms. Many scientific films were also shown. In the scientific program two official reports were presented. The first, by Prof. Dagmar Chaves, on osteotomy, limited to nontraumatic deformities, contained the following conclusions: (*a*) With the development of new equipment the use of metallic fixation has increased. (*b*) Subtrochanteric osteotomies of direction and support are largely being used in addition to reconstructive surgery. (*c*) In cases of acute deformity several successive osteotomies should be performed. The second official report was on fractures of the shaft of the femur. Dr. M. Lazzareschi stressed that, according to a study of 200 cases, conservative methods can give good results but require good nursing care, much equipment and prolonged hospitalization. Surgical methods have also provided good results. Kuentscher's method is preferred, especially in transverse fractures of the middle third. Plaster casts tend to be abandoned. Dr. Weinberger reported poor results with conservative methods and gave statistics from the Hospital de Pronto Socorro do Rio de Janeiro on 316 fractures of the shaft of the femur and 43 osteosyntheses. The author prefers osteosynthesis with long, thick plates and avoids the use of plaster casts.

Professor Meyerding presented a new classification of giant cell tumors and called attention to cases of secondary malignancy. Professors J. Valls and F. Schajawicz described a new type of primitive reticulum sarcoma of bone, of low malignancy, which is easily mistaken for Ewing's tumor. Dr. J. L. Bado advised bone graft in cases of hip fracture, stressing the value of his method in prevention of aseptic necrosis. He has obtained complete cure in 85 per cent of his cases. Dr. J. Hass discussed his classification of congenital dislocation of the hip, based on the study of a newborn infant. H. Portells insists on the importance of myelography and the lateral operative position of Young in the treatment of protruded intervertebral disk. Several papers on poliomyelitis were presented. Dr. J. S. Brandão discussed a new technic in the treatment of the paralyzed valgus foot with dual approach, one lateral and one posterior. Dr. O. P. Campos reported on the social and hospital problem of poliomyelitis in Brazil. Drs. J. P. Marcondes de Souza and B. Bartolomei commented on the poor results from arthrodesis or tendon transfer alone in cases of muscle imbalance of the foot. They stressed the advantages of combining arthrodesis with tendon transplant. For quadriceps paralysis both flexors should be transferred to avoid patellar dislocation. Dr. L. Mabilde reported on studies of 70 cases in which the intravenous administration of procaine hydrochloride (novocain®) was used for regional anesthesia, according to the method of Morrison-Bado, but modified by the speaker. Dr. D. C. Gonçalves and J. S. Lage discussed their experiences with acrylic prosthesis for arthroplasties of the hip. Dr. P. A. Moraes e Silva and Dr. H. Pisciotta reported on the conservative treatment by traction in trochanteric fractures in 22 cases. Dr. Godoy Moreira and Dr. Flavio Camargo have introduced a modification to the onlay graft technic, in which the cortical side of the graft is placed in contact with the fragments of the fracture. The blood supply of the graft is directed through the endosteum. Dr. R. Souza Ramos favors open reduction in fractures of the elbow, even when there is moderate displacement. Dr. E. Batalha demonstrated the good results obtained with bipolar fixation by Kirschner wires in 232 cases of fractures of the tibia.

Dr. R. Bomfim reported on a case in which hemipelvectomy was performed for a myxosarcoma of the thigh according to the Gordon Taylor technic with survival and good functional results with prosthesis. Dr. P. A. Moraes e Silva reported on eight cases of supracondylar amputation of the femur by the method of Callender and stressed the advantages of this technic. Dr. Wertheimer and co-workers reviewed 3,600 cases of craniocencephalic trauma with anatomic and clinical documentation. The experience of the Orthopedic and Traumatic Clinic of the Hospital das Clinicas concerning plastic and reconstructive surgery was discussed by Dr. L. de Abreu, who stressed the advantages of the skin bank.

Analyzing 32 cases of congenital dislocation of the hip, Dr. A. Bittar advised use of Levoeuf's method of open reduction. Dr. O. Graner reviewed 133 cases of obstetric trauma. In 60 per cent of patients with nerve lesions there are permanent sequelae, whereas a good prognosis can be expected in cases of pure osteoarticular injuries. Dr. Sparvoli reported good results with intramedullary instillation of penicillin in cases of osteomyelitis. Dr. D. Delfine reported good results with Boyd's double graft and delayed method of grafting in cases of congenital pseudarthrosis of the tibia. According to Dr. O. P. de Souza, streptomycin has changed the orthodox concepts of surgical treatment in bone tuberculosis, and arthrodesis may now be performed in any phase of the disease. Dr. J. Sardinha and Dr. R. Alves also outlined the value of streptomycin in sinus healing. Dr. R. Bomfim discussed operations for pseudarthrosis of the tibia with use of the Armstrong split bone graft technic. Experimental work on bone regeneration in rabbits was discussed by Dr. J. L. Correa do Lago.

The next Brazilian Congress will take place in Rio de Janeiro in 1952, under the presidency of Dr. O. P. Campos. The official reports will be (1) arthrodesis of the spine, Drs. Define, O. P. Campos, L. I. Barros Lima and E. J. Kanan, and (2) fractures of the wrist, Prof. Godoy Moreira, Dr. J. B. Faria, Dr. Bruno Maia and Dr. Secco Eichenberg.

COLOMBIA

New Cardiotonic Glucoside.—Drs. César Uribe-Piedrahita and Kalman Mezey have studied a new cardiotonic glucoside, "niaarin," isolated from the milky exudate of a Colombian tree, the pacuru-niaara or Ogcodeia ternstroemiiflora. In 1920, Uribe-Piedrahita described the symptoms in an animal given the latex of this tree, which the Catio Indians (a tribe of the Eastern forests of Colombia) call pacuru and use as an arrow poison in hunting. In 1945, Mezey made pharmacodynamic studies on the juice and concluded that it was a cardiac poison similar to the digitalis bodies. In collaboration with the chemist Janos Pataki, he partially isolated the glucoside which they called niaarin (*J. Pharmacol. & Exper. Therapy* **93**:223, 1948). Niaarin is a glucoside, or several glucosides, with a nonsaturated lactone group. The properties of niaarin are similar to those of antiarin. They are of approximately equal toxicity, and both are amorphous and easily soluble in water. Dr. Jorge Huertas Lozano conducted clinical experiments with an intravenous injection of a neutral solution of 0.25 mg. of niaarin and concluded that niaarin is a cardioactive glucoside with cardiotonic properties and is of clinical use. Mezey (*An. Soc. biol. Bogotá*, Oct. 1950) studied the comparative toxicity of niaarin, neriifolin, ouabain and digitoxin on the frog Hyla labialis. Minimum toxic doses of the glucoside so examined, per gram of body weight, were ouabain, 0.0007 mg.; niaarin, 0.0025 mg.; neriifolin, 0.0035 mg., and digitoxin, 0.0165 mg. The relation of cat to frog toxicity is 1:10 for niaarin and 1:17 for neriifolin. According to their biologic action, the glucosides neriifolin and niaarin are more closely related to ouabain than to digitoxin.

New Professors of the Faculty of Medicine.—On December 7, the Faculty of Medicine of the National University granted professorships to 42 doctors through the competitive contest required by the University since 1936. Titles, from intern or instructor to director of the clinic, are obtained in different competitive contests. The competitive contest for the professorship (assistant or titular) consists of various tests. Review of documents and scientific publications, oral and written examinations covering the material and pedagogic proof, in the form of a dissertation presented before a large audience, on a subject of free choice, are some examples of these tests.

CORRESPONDENCE

EMPLOYMENT OF PARAPLEGIC VETERANS

Recent publicity in the newspapers, particularly in a column by Frances Langford in the Hearst publications, revealed special employment of paraplegic veterans in an industrial concern in California. This organization was asked for additional information, and the following letter was received.—ED.

To the Editor:—With reference to your request to E. J. Rivers, president of Supreme Engineering Corp., for information regarding the employment of paraplegic veterans, I am enclosing some literature that tells a more complete story than the Langford column.

Additional facts: the type of work is assemblying and manufacturing aircraft parts, electronic equipment etc.; 26 paraplegics are now employed, with 4 new men being hired every week; only 4 new workers are hired at one time, in order that training does not slow down production—we don't have the capital to carry on a larger training program.

This plant will only handle about 45 paraplegics; however, we are planning to open another plant in the San Fernando Valley, in Van Nuys, as soon as this plant is operating at full capacity. Most of our eligible workers are among the 148 paraplegics (including myself) who tried so hard to keep the Birmingham V. A. Hospital in the San Fernando Valley. These 148 men own homes throughout the Valley, and most of them are anxious to go to work.

We are bidding on civilian subcontracts too, because we do not want to build our organization wholly on government defense work. The defense contracts, however, provide a golden opportunity to get our training program completed, and place the corporation on a firm paying basis. The defense contracts are from the major aircraft companies—such as Douglas Aircraft Inc. As we grow, we intend to bid on a much wider field of light assembly work.

The morale is excellent. Most of the fellows are holding down their first full-time job (40-hour week) since becoming disabled. It is a tremendous thing to be able to tell your able-bodied neighbor that you're working full-time. I think you can readily understand what a job can do for the totally disabled man who has been injured five years, and is now really taking a normal place in society.

Our special features are really quite simple: the special feature angle is often exaggerated with respect to wheelchair needs. We have a large toilet, in order that the chair may be wheeled in and around, with the stools far enough apart so a 30 inch chair can roll between them. Wash bowls are slightly higher than average, so that a chair can go under the bowl. Doors are all 36 inches or over, but this is not really a special feature because in a plant of this type it is imperative to have wide doors.

The parking lot necessitates having sufficient space to allow four or five feet between cars. With wheelchairs, the problem can generally be summed up as follows: It takes more space—for all operations—simply because to move around in a chair requires more floor space than needed for walking personnel. The work benches are at a height satisfactory for the wheelchairs; when our able-bodied foreman (Mr. Bechtel) puts a man on a new operation, he first sits down in a spare wheelchair and finds out for himself how difficult the task will be. In this manner, he has gained experience as to the limitations and also the tremendous possibilities of wheelchair employment.

The individual jobs include riveting, burring, drill press operators, parts assembly, filing, painting the assembled parts, inspection of work, secretarial and bookkeeping. The majority, at present, are doing riveting. We anticipate putting in some sewing machines—there are many good subcontracts in cloth manufacturing.

Our personnel comes primarily from the Paralyzed Veterans Association (522 members living throughout California), but, as we expand, we want to hire persons with all types of disabilities, especially amputees. As a paraplegic veteran, let me say that we certainly appreciate the opportunity given us by Mr. Rivers. In our P. V. A., we have 70 paraplegics working in various aircraft plants and other industries in southern California, men who were unemployed six months ago. The best factor of all: they are doing the job. If you desire additional information or have any questions, please do not hesitate to ask.

TED ANDERSON,
Vice President,
Supreme Engineering Corp.,
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Los Angeles 16.

HEALTH INSURANCE IN ISRAEL

To the Editor:—Having recently returned from Israel, where I was invited to make a study of the tuberculosis program, I would like to tell you of their health insurance program.

The Kupat Holim (Workers' Sick Fund) is the health service of the General Federation of Labor (Histadrut) in the state of Israel. The founders of Kupat Holim, a handful of agricultural workers in Judah and Galilee, established their first dispensaries in 1912. Larger scale developments began in 1921, following the foundation of the General Federation of Labor and the growth of the labor community within the country. From its small beginning of isolated dispensaries, there is now a widely ramified network of institutions throughout the country, which serves about one-half of the population.

The aim of the Sick Fund has been to provide an inclusive medical program. Briefly, the primary unit is the small medical aid station in the settlement. The staff consists of a doctor, who may divide his time among three to four settlements in the same area, traveling about in a jeep, and a full time nurse. The further links in the chain are the local, district and central dispensaries, with various departments of physical therapy, x-ray departments, laboratories and pharmacies, as well as hospitals and convalescent and recreation homes. In the larger cities, such as Tel Aviv, there is a small clinic for each 6,000 to 7,000 population, building up to the large central polyclinics with complete facilities. Complete medical care is provided plus dental care, medications and even a price reduction on eyeglasses and other appliances. Hospitals have been erected to round off the network, with the idea that the fund could assist the young government in providing beds for the growing population. In addition, the Kupat Holim has felt the responsibility for providing opportunities for the guidance and training of physicians requiring supplementary or refresher courses.

The Invalid Fund was established as a branch of the Workers' Sick Fund to provide for members suffering from chronic diseases, and there are several excellent institutions presently operating for tuberculosis, mental disease and chronic illness. The entire program includes postgraduate training for physicians and training schools for nurses. Courses in midwifery and "domestic economy" are also provided. The budget of the Workers' Sick Fund and Invalid Fund, for the year 1950, was considerably more than one half of the total spent by all health and hospital agencies in the country. Its principal income consists of membership fees, plus the amount paid by employers, i. e., 3 per cent of their employees' wages. There is also a small grant from the government since the new state came into being, a sum never larger than 6 per cent of the total budget.

There is a staff of 4,200, of which 960 are physicians and 1,200 nurses. It is anticipated that there will be an increase

V 14
1951

of an additional thousand persons of whom a large proportion will be physicians. The physicians are paid a fair salary with increments, which depend on several factors. The years out of school (diploma years), marital status and number of dependents are all significant factors. It not infrequently happens that an unmarried clinic chief may receive less salary than one of his assistants, who is married and has three to four children. While the salaries are in line with those of government physicians and officials, they do not compare with those of men in private practice. In the latter category, however, the income tax structure is such that few men in practice achieve large incomes.

In general, it may be said that the quality of medical care is excellent and suffers only from the great burden of rapidly increasing membership. It will take some time to develop additional clinic facilities, increase the staff and provide a sufficiency of hospital beds. Several questions may be raised by the medical profession in the United States.

1. Is there free choice of physician? In general, there can be no free choice. A physician is usually assigned to take care of a family. Consultations and diagnostic tests are used freely. Should the patient desire a change to another physician, he may consult the clinic head (or higher), explain his case and, if he cannot be persuaded to remain as he is, a change is effected. In the small settlements, where there is only one physician, there is no possibility of change unless the entire community appeals to the central office. I have not observed this situation, however, but rather that of a warm relation between doctor and settlement, not unlike that of the many small communities in America, with their old family doctors.

2. Is it a voluntary health insurance plan? The Medical Association of Israel claims that it is not. In order to get work, one must join a union, and if one joins a union he is automatically a member of the General Federation of Labor and automatically a member of the Workers' Sick Fund. In short, they regard this as more compulsory than voluntary. The Workers' Sick Fund deny this vehemently and showed me evidences of many groups that had joined the Fund for medical care without membership in the General Federation of Labor.

3. What is the attitude of the private practitioner and the medical association? There is little criticism of the care given, and there is great admiration for the fine hospitals and their staffs. It is also conceded that the Workers' Sick Fund has played a significant role in raising medical standards and providing adequate resources for the care of a large bulk of the population. There is resentment, however, over the failure of the Fund to employ part time physicians, encouraging immigration of doctors when there is presumably a greater doctor-patient proportion than anywhere in the world (3,200 doctors for 1,250,000 population). The answer given by the Fund is that doctors in practice have refused to assume the burden of medical service in the new rural communities and that there is need for young, hardy men with a pioneer spirit to do this job.

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VITAMIN C AND PRICKLY HEAT

To the Editor:—With regard to the interesting observation of Dr. Stern, who stated that "no mention of the use of vitamin C could be found in the literature," I offer the following material. In an article published in the *Journal of Laboratory & Clinical Medicine* (**28**:1082 [June] 1943) I described a condition called syringadenitis suppurativa tropicalis, which always developed as a sequel to prickly heat. Laboratory investigations gave evidence of a vitamin C depletion, and the condition responded to large doses of vitamin C (900-1,000 mg. daily). Small doses (200-300 mg.) were effective only when the hot weather subsided and perspiration decreased. It was also my conviction that a depletion of vitamin C is caused through excessive perspiration.

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BUREAU OF LEGAL MEDICINE AND LEGISLATION

MEDICOLEGAL ABSTRACTS

Paternity: Court's Right to Compel Blood Tests.—This was an action by the plaintiff wife to compel her husband to pay a weekly sum for the support of herself and an infant child. The defendant requested the trial court to compel the plaintiff and the infant child to submit to blood tests, but the trial court refused to do so. Accordingly the defendant appealed to the Superior Court of New Jersey, Appellate Division.

The wife admitted pre-marital sexual relations, within the probable limits of conception, with both the defendant and another and acknowledged her uncertainty as to the child's paternity. She refused to submit herself and the child to a blood test, however. The plaintiff claimed she told the defendant before their engagement, when about two months pregnant, of her uncertainty whether he or the other, a married man, was the father of the child to be born and that nevertheless the defendant agreed to marry her. The defendant denied having knowledge of her relations with anyone except himself until 15 months after the child's birth when the plaintiff taunted him during a dispute at their home that he was not the child's father. He left her at that time. The question presented by the defendant's appeal, said the court, is whether the denial of the motion for an order compelling a blood grouping test was a proper exercise of judicial discretion in the circumstances.

The trial court was empowered to order the requested test pursuant to a state law providing that "whenever it shall be relevant in a civil action to determine the parentage or the identity of any child or other person, the court, by order, may direct that any party to the action and the person whose parentage or identity is involved submit to one or more blood grouping tests, to be made by duly qualified physicians under such restrictions and directions as the court or judge may deem proper. Whenever such test is ordered and made, the testimony of the experts to the results thereof, subject to cross examination . . ., shall be receivable in evidence, but only in cases where definite exclusion is indicated." The foregoing is section 2 of a law enacted in 1939 and is applicable to civil causes in which it is relevant to determine the parentage or identity of any child or person. The statute, said the appellate division, relates to the obtaining of evidence in the field of contested paternity where the truth is so often obscured because social pressures create a conspiracy of silence or, worse, induce deliberate falsity. The value of blood tests as a wholesome aid in the quest for truth in the administration of justice in these matters cannot be gainsaid in this day. Their reliability as an indicator of the truth has been fully established. In the light of the wide acceptance of the value of the tests and the legislative recognition implicit in the statute of their competency to help the courts in the search for truth, we think, said the court, only reasons of a considerable force should move a court in a civil case to deny a motion for an order to compel a blood test when, as in this case, the issue of parentage is relevant and, it may be, crucial, in the disposition of the matter.

The plaintiff argued, in support of the trial court's action, that the ordering of the tests is discretionary. This is true, said the appellate division, but judicial discretion is not an arbitrary or personal discretion to be exercised according to the whim or caprice of the individual judge; it is a mere legal discretion and he should use the authority reposed in him when the essential requisites for its exercise exist and the justice of the course is apparent. Proof that the giving of the test would endanger the health of a person submitting to it necessarily would be a proper reason for exercising discretion to deny an order to compel such person to take the test, although the giving of a few drops of blood can rarely in the light of medical experience have that consequence and the burden of proof to show that probability in a given case should be on the person making the assertion. Too, if, on proper proofs, the court

entertains doubts whether this highly technical test can be adequately performed by competent and qualified technicians, it could hardly be suggested the court had exceeded the limits of permissible judicial discretion in denying an order to compel the taking of the tests. In the absence of these or other like special conditions, however, we think the demonstrated utility of this tool of evidence should move trial courts in civil actions to employ it freely.

The plaintiff argued that the statute implies that she may not be ordered to submit to the tests if she refuses to do so. This is not so, said the appellate division. The first section of the statute applicable to criminal and quasicriminal proceedings has language which may arguably imply a privilege of declination. This is the last sentence reading "Whenever the court orders such blood grouping tests to be taken and one of the persons thus directed shall refuse to submit to such tests, such fact shall be disclosed upon the trial in the discretion of the court." Even assuming a person in a criminal case is privileged, by force of the quoted sentence, to refuse to submit to a test, such privilege cannot be successfully claimed by a person concerned in a civil action because no like provision implying the privilege appears in the section two. This omission cannot have been accidental; it is presumed to have been a matter of legislative design. It is apparent the omission reflects a legislative intent that in civil actions the trial court in a proper case shall have authority to order the tests despite a refusal voluntarily to submit, and as a necessary corollary to enforce obedience to such order by appropriate and familiar judicial sanctions.

Other contentions of the plaintiff were also overruled and the appellate division held that the interests of justice require the trial court to reconsider defendant's motion to the end that valuable evidence relevant to the case may not be overlooked, if it may be obtained in a manner consistent with the rights of the parties and of the child through blood tests properly performed. Accordingly the judgment in favor of the plaintiff was reversed.—*Cortese v. Cortese, 76 A. (2d) 717 (New Jersey, 1950).*

COUNCIL ON MEDICAL EDUCATION AND HOSPITALS

POLICY ON GRADUATES OF UNAPPROVED MEDICAL SCHOOLS

For many years, the Council has included in its Essentials of an Approved Internship and Essentials of Approved Residencies and Fellowships a requirement to the effect that appointments of graduates of American medical schools to the intern and resident staff should be limited to graduates of medical schools approved by the Council. With the exception of physicians who had served with the Armed Forces during the last war, graduates of unapproved medical schools in this country were not considered eligible for appointment.

After 45 years of effort by the Council to raise the standards of medical education, all medical schools presently in operation in this country have now been admitted to the Council's list of approved medical schools. Substandard schools appear finally to have vanished from the contemporary scene. The last medical school which had not been previously approved, but continued to graduate physicians whose licensure privileges were restricted, raised its standards so that it could be accorded full approval in the fall of 1948.

In view of the fact that there are no longer any medical schools in operation in this country which are not presently approved, the Council has reviewed its present requirements and has announced that they will be interpreted to mean that any physician of unquestioned moral and professional integrity, who holds the degree of Doctor of Medicine obtained on the basis of four years of study in an American medical school recognized by one or more of the state boards of medical licensure and who is licensed as a doctor of medicine in the state in which a hospital is located, may be appointed by that hospital, if it considers him to be qualified, to its intern or residency staff without prejudice to its approved status. This action is taken in the belief that it will enable graduates of unapproved medical schools already licensed to practice medicine to improve the quality of their medical care without encouraging the continuation of substandard schools. This policy will remain in effect at least so long as all medical schools in this country remain approved.

DONALD G. ANDERSON, *Secretary.*

MEDICAL MOTION PICTURES

You Can Lick TB: 16 mm., black and white, sound, showing time 21 minutes. Produced in 1950 by and procurable on loan from Presentation Division, Veterans Administration, Washington, D. C.

This is an attractive, well produced film, designed primarily for helping tuberculosis patients in Veterans Administration hospitals to understand the importance of completing prescribed treatment and rehabilitation before leaving the hospital. The story is about a patient who is restless and unhappy and is illustrated by a convincing conversation which he has with his physician. Shots illustrating this conversation are used to emphasize the points the physician makes in regard to the importance of continued treatment.

The last third of the film comprises a detailed description of an unusually thorough rehabilitation and occupational training program, which restricts the use of the film to hospitals that have a program of this character and might produce dissatisfaction if shown to patients in hospitals not having these unusual facilities. On the other hand, the presence of these facilities would make this an excellent film for showing to physicians and other professional groups concerned with the handling of tuberculosis patients and to the boards and administrative groups of tuberculosis hospitals. One of the closing sequences is a closeup of the tuberculous patient smoking a cigaret. There is little to be gained by this scene, and it might well be deleted.

The educational approach used is good, the story is easy to follow, the facts presented are important and emphasized by repetition, and the music, particularly the theme song "You Can Lick TB," is very effective. It is especially recommended for the audience for which it was intended, namely, the tuberculous patient in a Veterans Administration hospital. The photography and narration are excellent.

NEW MOTION PICTURE ADDED TO A. M. A. FILM LIBRARY

You Can Beat the A-Bomb: 16 mm., black and white, sound, showing time 19 minutes. Produced in 1950 by Emerson Film Corporation and Crystal Productions, Inc. Procurable on loan (service charge $3.00) from Committee on Medical Motion Pictures, American Medical Association, 535 North Dearborn Street, Chicago 10.

This film demonstrates a planned, personal defense from the moment warning systems give notice of an atom bomb attack to the instant the bomb explodes and the hours following the explosion. It highlights the fact that the atomic bomb has its limitations and the individual who knows how to take advantage of these limitations by means of simple precautions will considerably increase his chances of survival. The defenses and precautions against attack by air, ground and water bursts are included.

One of the main assets of the film lies in the fact that the defenses and precautions recommended and demonstrated are reasonably simple and do not require expensive equipment which would be available to only a few people. There are a few implications which should be corrected such as the showing of an ordinary radio still operating after an explosion which probably would have wrecked power facilities. However, even with these limitations, the film is recommended for use by all civilian defense agencies.

The photography and sound are good.

V 14
1951

MEDICAL LITERATURE ABSTRACTS

AMERICAN

A.M.A. Archives of Internal Medicine, Chicago

87:1-180 (Jan.) 1951

*Radioactive Iodine in Treatment of Hyperthyroidism. E. P. McCullagh and C. E. Richards.—p. 4.
Diagnostic and Therapeutic Use of Radioactive Iodine. D. E. Clark, O. H. Trippel and G. E. Sheline.—p. 17.
*Recession of Neuroretinopathy During Course of Malignant Hypertension: Its Occurrence in 15 Patients Who Did Not Receive Directed Therapy. N. M. Keith and H. P. Wagener.—p. 25.
Primary Thrombocytopenic Purpura and Acquired Hemolytic Anemia: Evidence for Common Etiology. R. S. Evans, K. Takahashi, R. T. Duane and others.—p. 48.
Aureomycin in Treatment of Bacterial Endocarditis: Report of Nine Cases Together with Study of Synergistic Action of Aureomycin and Penicillin in One Case. H. W. Spies, H. F. Dowling, M. H. Lepper and others.—p. 66.
*Essential Hyperlipemia. E. R. Movitt, B. Gerstl, F. Sherwood and C. C. Epstein.—p. 79.
Gastric Changes in Pernicious Anemia—Review: I. Pathology. L. C. Molofsky and F. Hollander.—p. 97.
Id.: II. Physiology. L. C. Molofsky and F. Hollander.—p. 110.
Infectious Diseases: Sixteenth Annual Review of Significant Publications. H. A. Reimann.—p. 128.

Radioactive Iodine in Hyperthyroidism.—McCullagh and Richards studied the comparative efficacy of radioactive iodine, I^{131}, on toxic diffuse goiter and on toxic nodular goiter. They found that larger doses and longer periods of time were required for a cure of hyperthyroidism associated with nodular goiter. Of 78 patients with this condition, 18 (23 per cent) were still hyperthyroid after treatment for 2 to 10 months. The average total dose of I^{131} was about 34 millicuries. Of 203 patients with toxic diffuse goiter, only 16 (8 per cent) were still hyperthyroid after a comparable period and with an average total dose about one third as great. In both types of disease the dosage of I^{131} required for a remission was related more closely to gland size than to basal metabolic rate. In diffuse toxic goiter a gland weighing over 50 Gm. required a 74 per cent increase in dosage in some cases, while in patients with a basal metabolic rate over + 50 per cent only a 15 per cent increase was required. This relation was less definite in cases of nodular goiter. The only complication of treatment was hypothyroidism, which occurred in 10 per cent of patients with diffuse goiter and in none of the patients with nodular goiter. The authors conclude that treatment with I^{131} is acceptable in selected cases of toxic nodular goiter, as well as in toxic diffuse goiter, provided the shortcomings of the method are taken into consideration. The existing preference for surgical treatment may be justified in patients with a single true adenoma, but it is not justified in multinodular goiter, in which nodules are likely to remain after subtotal thyroidectomy.

Recession of Neuroretinopathy During Malignant Hypertension.—Spontaneous recession of the papilledema of malignant hypertension has been observed by Keith and Wagener in 15 patients (10 men and five women from 29 to 62 years of age with diastolic pressures varying from 115 to 160 mm. of mercury). The changes were similar to those sometimes occurring in patients receiving specific therapy, but 12 of the authors' 15 patients had no specific therapy. After recession of the papilledema the general features of the disease persisted, but there was an improvement in the patients' vision and general health and a significant delay in the development of serious complications and ultimate fatal outcome. Disappearance of the papilledema was associated with a decrease or disappearance of the diffuse retinopathy in most patients. The arteriosclerosis was unchanged or increased. There was a recurrence of the papilledema in one case and of the retinopathy in another. Most of the patients had evidence of concurrent involvement of the brain, heart and kidneys, and most of them eventually died of cerebral failure. This study suggests that hypertensive neuroretinopathy is produced by decompensation of the circulation of the optic nerve, retina and choroid rather than by an increase in cerebrospinal pressure. Presumably, sudden increases in blood pressure precipitate the changes in the eyes and other organs. Subsidence of the papilledema suggests compensation of the retinal circulation. While the appearance of neuroretinopathy in hypertensive patients is a bad prognostic sign, its subsidence indicates an improved outlook.

Essential Hyperlipemia.—Movitt and associates report on three cases of essential hyperlipemia and review the features of this disease. They point out that persistent hyperlipemia, which is always pathological, must be distinguished from transitory hyperlipemia, which occurs physiologically following a fatty meal. Persistent hyperlipemia may occur in association with a number of diseases (diabetes mellitus, lipid nephrosis, nephrotic stage of glomerulonephritis, thrombosis of renal veins, pancreatitis, hepatic disease, obstructive jaundice, poisoning, myxedema, anemias, leukemias, anoxemic and cachectic states, von Gierke's disease and Niemann-Pick disease) or independently of any other disease as "essential" hyperlipemia. This is a rare familial disorder of fat metabolism of unknown origin characterized by pronounced elevation of total blood lipids due mostly to an increase in neutral fat. Cholesterol and phospholipids may also be increased, however. The condition may be asymptomatic but frequently is associated with abdominal pain, cutaneous xanthomatosis, lipemic retinitis and hepatosplenomegaly. Sometimes abdominal pain is so severe that it suggests a surgical emergency. This condition should be kept in mind in all cases of abdominal pain of obscure origin. The symptoms usually subside when dietary fat is reduced, only to recur when an average or high fat diet is resumed. Bone marrow biopsy often reveals fat storage cells. In contrast to familial hypercholesteremic xanthomatosis, essential hyperlipemia has a benign prognosis with no tendency toward premature arteriosclerosis.

A.M.A. Archives of Pathology, Chicago

51:1-136 (Jan.) 1951

Diffuse Glomerulonephritis Induced in Rabbits by Small Intravenous Injections of Horse Serum. C. R. McLean, J. D. L. Fitzgerald, O. Z. Younghusband and J. D. Hamilton.—p. 1.
Pathogenesis of Experimental Arteriosclerosis in Pyridoxine Deficiency, with Notes on Similarities to Human Arteriosclerosis. J. F. Rinehart and L. D. Greenberg.—p. 12.
Effect of Strontium Chloride Feeding on Rat Molars and Their Supporting Tissues. S. O. Banks, S. N. Bhaskar and J. P. Weinmann.—p. 19.
Unilateral Renal Cortical Necrosis and Unilateral Benign and Malignant Nephrosclerosis Associated with Contralateral Renal Artery Occlusion: Report of Case. S. M. Aronson and M. C. Sampson.—p. 30.
Possible Effects of Hypersplenic Extracts on Hemopoietic Organs of Mice. W. R. Platt and O. A. Zeller.—p. 38.
Histologic and Perfusion Studies of Unmanipulated Kidney in Rabbits with Unilateral Renal Hypertension. J. Flasher, H. A. Edmondson and D. R. Drury.—p. 53.
Tumors of Heart: Review of Subject and Report of 150 Cases. R. W. Prichard.—p. 98.

American Journal of Clinical Pathology, Baltimore

20:1099-1192 (Dec.) 1950

Vascular Changes in Decidua Associated with Eclamptogenic Toxemia of Pregnancy. P. M. Zeek and N. S. Assali.—p. 1099.
Studies on Anticoagulant Action of Heparin. N. Applezweig, N. Wald, J. Vorzimer and L. N. Sussman.—p. 1110.

The Association library lends periodicals to members of the Association and to individual subscribers in Continental United States and Canada for a period of five days. Three journals may be borrowed at a time. Periodicals are available from 1940 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied with stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted.

American Journal of Ophthalmology, Chicago

33:1665-1829 (Nov.) 1950

SYMPOSIUM ON SECONDARY GLAUCOMA

Foreword. F. B. Fralick.—p. 1665.
Secondary Glaucoma Due to Cataract. R. O. Rychener.—p. 1666.
Glaucoma Secondary to Uveitis. W. B. Clark.—p. 1669.
Glaucoma Secondary to Trauma. W. S. Knighton.—p. 1673.
Congenital or Infantile Glaucomas. H. S. Sugar.—p. 1676.
Macula in the Elderly. A. J. Bedell.—p. 1681.
Spontaneous Cysts of Ciliary Body Simulating Neoplasms. A. B. Reese. —p. 1738.
Vision of Adolescent Boys. A. E. Sloane and J. R. Gallagher.—p. 1746.
Stimulus-Response Mechanisms in Binocular Coördination. E. F. Tait. —p. 1751.
Hard Plastic Spectacle Lens. M. W. Nugent and R. Graham.—p. 1763.
Pathologic Aspects of Retrolental Fibroplasia. E. Wolff.—p. 1768.
Relationship of Heterophoria to Depth Perception in Aviation. J. V. V. Nicholls.—p. 1775.

American Journal of Surgery, New York

80:613-840 (Nov. 15) 1950. **Partial Index**

Primary Anterior Dislocation of Shoulder. H. L. McLaughlin and W. U. Cavallaro.—p. 615.
Tennis Elbow. J. M. Meherin and C. E. Cooper.—p. 622.
Colles' Fracture. R. G. Carothers and D. N. Berning.—p. 626.
Ski Injuries. G. M. Morrison and E. J. Coughlin Jr.—p. 630.
Use of Homografts in Extensively Burned Patients. G. B. Sanders and R. H. Moore Jr.—p. 637.
*Human Bites of Head and Neck. G. F. Crikelair and G. S. Bates. —p. 645.
Planned Timing in Treatment of Chronic Osteomyelitis Under Antibiotic Control. C. S. Venable and E. J. Pulaski.—p. 649.
Trauma to Perineum, Anus, Rectum and Colon. V. E. Siler and K. Bebb.—p. 652.
Medullary Fixation of Femoral Shaft Fractures. D. C. Hucherson. —p. 666.
Internal Fixation with Smith-Petersen Nail and Extension Bar in Treatment of Intertrochanteric Fractures of Femur: Review of 132 Cases. K. M. Lewis.—p. 669.
Use of Refrigerated Bone on Large Fracture Service. W. G. Stuck and W. S. Dandridge.—p. 696.
Avulsions of Scalp with Plastic Repair. L. L. Howard, T. M. Armstrong and D. Smith.—p. 714.
Suction Socket Prostesis for Above-Knee Amputations. A Thorndike and H. D. Eberhart.—p. 727.
Blood and Plasma Volume Studies in Severely Injured. M. E. Dodds and G. J. Curry.—p. 732.
Functional Repair of Mandible Following Bone Loss from Injury, Irradiation Necrosis or Tumor. C. L. Kiehn and D. M. Glover. —p. 753.
Principles of Management of Open Wounds of Hand. M. L. Mason. —p. 767.
Primary Tenorrhaphy and Neurorrhaphy of Hand and Forearm. V. E. Siler.—p. 772.
Delayed Tendon Repairs. W. C. Graham.—p. 776.
Crushing Wounds of Hand. H. S. Allen.—p. 780.
Acute Burns of Hand. H. Miller and J. L. Posch.—p. 784.

Human Bites of Head and Neck.—Reports of therapy of human bites have been concerned mostly with bites of the fingers and hands. These are usually sustained when the fist is hit against the teeth, with resultant laceration of the skin and usually of the tendon sheath and joint capsule. Opening of the hand causes the tendon to glide upward, carrying contaminants with it. This may result in severe crippling with subsequent amputation and, occasionally, death. Observations on 46 patients who had sustained human bites of the face and neck convinced Crikelair and Bates that these wounds, even though they are infected, are not as severe or disabling as those of the hands. Lacerations and tissue defects resulting from human bites of the head and neck can be safely treated as facial lacerations from other causes, except that tetanus antitoxin need not be given. For comparative study the 46 cases were divided into three groups: group 1, wounds infected at the time of admission; group 2, fresh wounds not sutured, and group 3, fresh wounds sutured. The infected wounds were treated with continuous wet applications. The fresh wounds not sutured were also treated with continuous wet dressings after preliminary débridement. All wounds that were sutured immediately were washed for 10 minutes with soap and water, débrided and sutured under local or regional block anesthesia. Of the 46 patients, 35 were given either a sulfonamide drug or penicillin and two received both. Hospitalization usually lasted five or six days. At the time of discharge 19 of the 20 wounds in the first group and all the 13 wounds in the second group were clean and granulating. One wound had been secondarily repaired and was well healed. Since no attempt had been made to close these wounds many patients needed cosmetic procedures at a later date. In the third group, 12 of the 13 wounds healed by first intention and were cosmetically satisfactory. The authors feel that anatomic factors explain the fact that human bite wounds of head and neck are less serious than are those of the hands.

Circulation, New York

2:801-960 (Dec.) 1950

Present Status of Treatment of Subacute Bacterial Endocarditis. A. L. Bloomfield.—p. 801.
Electrical Impedance Plethysmography. Physical and Physiologic Approach to Peripheral Vascular Study. J. Nyboer.—p. 811.
Effect of Posture and of Congestion of Head on Sodium Excretion in Normal Subjects. J. M. Lewis Jr., R. M. Bute, S. M. Sevier and T. R. Harrison.—p. 822.
*Experimental and Clinical Evaluation in Man of Hexamethonium (C_6), New Ganglionic Blocking Agent. F. A. Finnerty Jr. and E. D. Freis. —p. 828.
*Subcutaneous Use of Heparin: Summary of Observations. G. de Takats. —p. 837.
Oxygen Tension of Tissues by Polarographic Method: II. Detection of Right to Left Shunts by Changes in Skin Oxygen Tension Resulting from Inhalation of Oxygen. H. Montgomery, H. F. Zinsser Jr. and O. Horwitz.—p. 845.
Effect of Smoking upon Blood Flow in Sympathectomized Limb. S. I. Rapaport, H. A. Frank and T. B. Massell.—p. 850.
Myocarditis in Acute Infectious Diseases: Clinical and Electrocardiographic Study. I. Fine, H. Brainerd and M. Sokolow.—p. 859.
Therapy of Paroxysmal Pulmonary Edema by Antifoaming Agents. A. A. Luisada.—p. 872.
Congenital Aortic Septal Defect with Communication Between Aorta and Pulmonary Artery: Case Report and Review of Literature. H. Spencer and H. J. Dworken.—p. 880.
Stokes-Adams Attacks Induced by Rectal Stimulation in Patient with Complete Heart Block. R. W. Scott and S. M. Sancetta.—p. 886.
Ventricular Electrokymogram. L. C. Akman, A. J. Miller, E. N. Silber and others.—p. 890.
Correlation of Simultaneously Recorded Electrokymograms and Pressure Pulses of Human Heart and Great Vessels: Preliminary Report. A. H. Salans, J. A. Schack and L. N. Katz.—p. 900.
*Aortography in Infants. J. D. Keith and C. Forsyth.—p. 907.
Aortic Length: Angiocardiographic Measurements. C. T. Dotter, D. J. Roberts Jr. and I. Steinberg.—p. 915.
Nature of RS-T Segment Displacement as Studied with Esophageal Leads: III. Effects of Digitalis. A. A. Sandberg, L. Scherlis, A. Grishman and J. Wener.—p. 921.
Modern Treatment of Coronary Thrombosis with Myocardial Infarction. I. S. Wright.—p. 929.

Experimental and Clinical Evaluation of Hexamethonium.—A hexamethonium salt (a hexamethylene bistrimethyl ammonium derivative), a new ganglionic blocking agent, was administered in doses of 50 mg. intravenously to 55 persons, including normal subjects and patients with various types of peripheral vascular disease or hypertension. The authors found that sympathetic vasopressor reflexes, including the hypertensive overshoot to the Valsalva maneuver and the tiltback overshoot, were inhibited or abolished. The cold pressor response was inhibited, as were the reflex vasoconstrictor responses in the digits to noxious stimuli. A significant increase in digital skin temperature, usually with abolition of the temperature gradient, occurred in cool as well as in warm environments. The response was more pronounced in the toes than in the fingers except when the latter exhibited abnormal vasoconstriction. The rise in digital skin temperature was accompanied with simultaneous increases in digital blood flow and pulse volume as measured plethysmographically. The rise in digital skin temperature after administration of hexamethonium was usually greater and more prolonged than that achieved following either priscoline* (2-benzyl-4,5-imidazoline hydrochloride) or tetraethylammonium therapy. The reduction in supine arterial pressure was frequently minimal in normotensive persons and sometimes pronounced in hypertensive patients. Because of the inhibition of sympathetic vasoconstriction, a severe postural hypotension was a regular occurrence, sometimes precipitating vasomotor collapse in the erect position or after moderate degrees of blood loss. Occasional severe hypotensive reactions occurring in the supine position could be prevented or treated by slight elevation of the foot of the bed. The duration of action of hexamethonium was one to two hours when injected intravenously. It was effective by all parenteral routes but was inactive after oral or sublingual

V 14
1951

administration. Preliminary data suggest that the drug may be used clinically in the evaluation of the sympathetic vasoconstrictor component in cases of peripheral vascular disease as well as in the treatment of acute peripheral vascular disorders associated with neurogenic vasospasm.

Subcutaneous Use of Heparin.—Various heparin solutions and suspensions were tested for efficacy when administered subcutaneously in a number of patients. A preliminary heparin tolerance test was performed on each patient, and the coagulation time was determined before and every two hours after the administration of heparin, until the preinjection level of coagulation time was reached. Results showed that an emulsion of heparin in gelatin as a retarding medium served as a simple and efficient anticoagulant when injected subcutaneously. The great variability of response to heparin makes set schedules of dosage impossible. Two milligrams per kilogram of body weight is a good average prophylactic daily dose. The therapeutic dose should always be double the prophylactic dose. The administration of heparin should be continued for two weeks in acute thromboembolic episodes. The determination of heparin tolerance gives a good insight into the state of the clotting mechanism; it can be done in vivo or in vitro. With the principle of giving only enough anticoagulant to restore the clotting mechanism to its normal level but not necessarily prolonging the clotting time, a single injection of heparin a day or every second day seems sufficient, and the danger of hemorrhage is greatly minimized.

Aortography in Infants.—Keith and Forsyth describe their method of visualizing the aorta of infants with contrast medium. It requires the introduction of a number 18 needle into the brachial artery and the rapid injection through it of 5 cc. of iodopyracet injection (35 per cent solution of diodrast). While the injection proceeds, serial roentgen ray pictures are taken at the rate of three or four a second. The aorta is clearly outlined for approximately one second. Aortograms were made by this method on 26 infants and young children. Thirteen of them between the ages of 3 months and 4 years had no evidence of any abnormality in the aortogram. The remaining 13, between the ages of 1 week and 2½ years had evidence in the aortogram of patent ductus arteriosus, persistent truncus arteriosus or coarctation of the aorta. Clinically, patients with patent ductus arteriosus showed a continuous murmur, a systolic murmur or no murmur at all. Thus aortography proved useful for diagnosis in doubtful or obscure cases. The practical importance of the correct diagnosis is presented with reference to four infants with patent ductus arteriosus. All had grossly enlarged hearts and a history of serious heart failure due to the congenital anomaly. All were operated on successfully. Coarctation of the aorta was clearly outlined by the author's method in three infants and in one child, aged 2½. In none of these children were the femoral arteries palpable. All had moderate cardiac enlargement, and none were considered to have pure coarctation. The presence of coarctation was proved at postmortem examination in two infants and at operation in a third.

Diseases of Chest, Chicago

18:521-638 (Dec.) 1950

Tibione: Laboratory and Clinical Studies. J. D. Davis, S. Netzer, J. A. Schwartz and E. H. Pattison.—p. 521.
*Nebulized Cortisone in Bacterial Pneumonia. W. H. Reeder and G. S. Mackey.—p. 528.
Water-Soluble Contrast Medium for Bronchography: Report on Clinical Use. R. J. Atwell and R. L. Pedersen.—p. 535.
Prognostic Significance of Idiopathic Pleural Effusion. A. Falk.—p. 542.
Dust Inhalation in Relation to Pulmonary Disease. J. E. Silson.—p. 562.
Respiratory Effects of Volatile Substances. A. G. Cranch and T. W. Nale.—p. 574.
*Cholesterol Pleural Effusion: Report of Three Cases with Cure by Decortication. A. Goldman and T. H. Burford.—p. 586.
Pericardiotomy for Shifting Bullet. L. Shu-Fan.—p. 595.
Non-Cooperative Patient. D. Morse and R. H. Runde.—p. 599.
Epidemiologist and Eradication of Tuberculosis. H. A. Burns.—p. 609.

Nebulized Cortisone in Bacterial Pneumonia.—Reeder and Mackey treated one man aged 60 with type VII pneumococcic pneumonia with cortisone by inhalation. A total of 25 mg. of cortisone (11 dehydro- 17 hydroxycorticosterone 21 acetate) was diluted with 4 cc. of isotonic sodium chloride solution, and 1 cc. of this mixture was given as an aerosol every 30 minutes for 33 hours. Then aureomycin was given for nine days. Rapid subjective improvement and drop in temperature resulted from the administration of cortisone. The disease process in the lungs was apparently not affected. The bacterial agent was not influenced, although the reaction of the host to the disease was favorably influenced. Inhalation of cortisone appears to be as effective as parenteral administration. Additional comfort and relief of apprehension may be afforded the critically ill patient by the use of cortisone. Inhalations of cortisone in the dilutions used do not appear to be irritating to trachea or bronchi.

Cholesterol Pleural Effusion.—Goldman and Burford report on three patients, two women aged 44 and 40 and one man aged 64, with cholesterol pleural effusion. In the first patient pleural decortication was carried out with complete recovery after innumerable aspirations over a period of several years. In the second patient tubercle bacilli were demonstrated on direct smear and by guinea pig inoculation. This observation is rare in cholesterol pleurisy. Cholesterol deposits in the pleura of the first patient and caseocalcific pleural deposits in the second patient were responsible for the high cholesterol content of the fluid and the precipitation of cholesterol crystals. In the third patient cholesterol pleural effusion was associated with malignant invasion of pleura. In this patient metastatic adenocarcinoma of the lung and pleura was revealed by thoracotomy. The fact that this was a mucin-producing tumor suggests the possibility of a connection between mucin production and cholesterol precipitation.

Electroencephalography and Clin. Neurophys., Boston

2:373-502 (Nov.) 1950. **Partial Index**

Effects of Polarizing Currents on Cell Potentials and Their Significance in Interpretation of Central Nervous System Activity. G. H. Bishop and J. L. O'Leary.—p. 401.
Autogenetic Inhibition. R. Granit.—p. 417.
Synchronous Activity in Normal and Atrophic Muscle. F. Buchthal and A. Madsen.—p. 425.
Spontaneous Electrical Activity of Spinal Cord. J. ten Cate.—p. 445.
Fibre Type and Frequency Effect as Factors Determining Response to Afferent Stimulation. O. A. M. Wyss.—p. 453.
Effects at Different Frequencies of Cerebellar Stimulation upon Postural Tonus and Myotatic Reflexes. G. Moruzzi.—p. 463.
Stability of Randomly Assembled Nerve-Network. W. R. Ashby.—p. 471.
Behavioral and EEG Changes Following Chronic Brain Stem Lesions in Cat. D. B. Lindsley, L. H. Schreiner, W. B. Knowles and H. W. Magoun.—p. 483.

Florida Medical Association Journal, Jacksonville

37:331-402 (Dec.) 1950

Diagnosis of Spontaneous Internal Biliary Fistulas and Complication, Gallstone Ileus. D. W. Smith, M. M. Greenfield and M. G. Gould.—p. 347.
Medical Aspects of Blindness in Children. N. S. Rubin.—p. 350.
Carcinoma of Head and Neck. J. B. Farrior and R. A. Bagby.—p. 355.
Corneal Section and Suture in Cataract Operation. C. W. Boyd.—p. 360.
Mesenteric Thrombosis. P. A. Drohomer and A. M. McCarthy.—p. 365.

Georgia Medical Association Journal, Atlanta

39:473-556 (Dec.) 1950

Hypnosis in Therapy. R. M. Nelson and C. H. Thigpen.—p. 473.
Sudden Death in Psychiatric Practice. J. D. McElroy.—p. 479.
Adrenogenital Syndrome. R. H. Chaney and R. B. Greenblatt.—p. 482.
Common Tumors of Genito-Urinary Tract: Clinical Aspects. R. W. McAllister.—p. 487.
Vocational Rehabilitation of Cardiac Patients. J. C. Massee.—p. 495.
The M. D. Goes PR. L. W. Rember.—p. 498.
Georgia Plan. R. J. Eales.—p. 503.

Geriatrics, Minneapolis

5:297-356 (Nov.-Dec.) 1950

Rejuvenative, or Preventive and Eliminative Treatment of Senility. V. Korenchevsky.—p. 297.
Physiological Aspects and Treatment of Emphysema. B. Gordon, H. L. Motley, P. A. Theodos and L. P. Lang.—p. 303.
Effect of Potassium Iodine on Aortic Atherosclerosis in Rabbits. C. Moses and G. M. Longabaugh.—p. 310.
Aspiration Biopsy of Bone Marrow in Diagnosis of Multiple Myeloma. L. H. Beizer.—p. 314.
Post-menopausal Osteoporosis of Spine. G. M. Hart.—p. 321.
Ambulatory Care of the Aged. M. Thewlis and E. T. Gale.—p. 331.

GP (J. Am. Acad. of Gen. Practice), Kansas City, Mo.

2:1-162 (Dec.) 1950

Office Obstetrics in Rural Practice. D. G. Miller Jr. and B. H. Miller. —p. 34.
The Liver and Jaundice. M. B. Dockerty.—p. 49.
Drug Eruptions. H. Beerman.—p. 55.
Emotional Problems of the Chronically Ill. G. Saslow.—p. 62.
Gallbladder Disease. M. E. Rehfuss.—p. 68.

Indiana State Medical Assn. Journal, Indianapolis

43:1177-1276 (Dec.) 1950

*Encephalomyelitis Due to Pasteur Treatment: Report of Fatal Case with Review of Literature. C. Fisch and D. E. Wood.—p. 1197.
Thrombosis and Dicumarol Therapy. C. P. Segard.—p. 1202.
Twins: One Macerated; the Other Near Term and Normal: Case Report. M. Cornacchione, M. H. Gotlib, W. Huse and J. I. Taube. —p. 1207.
Newer Concepts of Intestinal Obstructions. E. L. C. Broomes.—p. 1210.
Prevention of Deformities with Tolserol. F. A. Streck.—p. 1213.

Encephalomyelitis Due to Pasteur Treatment.—Fisch and Wood present a case of paralysis following the Pasteur treatment in a man aged 26. About May 21, 1948, the patient was bitten on the right arm by a rabid dog. The Pasteur treatment was started immediately. Each injection was followed by a severe local reaction and elevation of temperature that lasted about eight hours. The full course of treatment was finished on June 3. That night the patient had a high temperature, severe headache and backache. The next morning he was found to be paralyzed from the waist down. The temperature was 107 F. The paralysis ascended rapidly, and on June 7 there was complete paralysis of the intercostal muscles. Despite reduction of excessive spinal fluid pressure by puncture and attempts to assist breathing in a respirator, the man died on June 11. The pathological diagnosis was subacute encephalomyelitis of a disseminated and necrotizing type, compatible with a severe postvaccinal reaction. There are conflicting opinions about the cause of postvaccinal paralysis, but it has been definitely proved to be entirely independent of the rabies virus. The authors discuss the indications, contraindications and complications of antirabies treatment, giving particular attention to two recent reports by Sellers, who believes that "It is not hydrophobia but rather rabiphobia which constitutes the major and most troublesome problem."

J. American Med. Women's Assn., Nashville, Tenn.

5:477-518 (Dec.) 1950

*Problems of Antepartum Cardiac Clinic. C. Curtiss.—p. 477.
Dicumarol Therapy: Experiences with Prolonged Administration. A. Brown, B. Lia and M. Pittman.—p. 481.
Ovarian Pregnancy. A. P. D. Manton.—p. 485.
Ruptured Spleen in Infectious Mononucleosis. S. Gulben.—p. 488.

Antepartum Cardiac Clinic.—Curtiss discusses the diagnosis and management of heart disease during pregnancy. She reports that of 99 patients referred to the antepartum cardiac clinic in one year because of suspected heart disease, the diagnosis was confirmed in only 12, who had chronic rheumatic heart disease. She points out that it is easy to be misled by a loud systolic murmur, which is commonly heard in pregnant patients with normal hearts, or by a loud mitral first sound ordinarily suggesting mitral stenosis but also heard in normal hearts during pregnancy. In the management of most of the cases of rheumatic heart disease in this series interruption of pregnancy was not considered because of religious objections. Thus, in some cases, in which the pregnancy would ordinarily have been interrupted, it was found that the patient fared better than had been expected. None of these patients, however, had signs of advanced heart disease, such as auricular fibrillation or history of previous acute congestive failure, and none of the patients was over 35, after which age the incidence of congestive heart failure in pregnancy doubles. It has been the author's policy to allow a woman with chronic rheumatic heart disease who is not over 32, who has never been in congestive failure and who does not have auricular fibrillation or 30 per cent increase in heart size to go through pregnancy, particularly if she has already borne other pregnancies well. Cesarean section is not advocated for treatment of pregnant women in congestive heart failure.

Journal of Bacteriology, Baltimore

60:681-790 (Dec.) 1950. **Partial Index**

Isolation of Cultivation of Lactobacillus Bifidus: Comparison of Branched and Unbranched Strains. R. F. Norris, T. Flanders, R. M. Tomarelli and P. György.—p. 681.
Properties of X-Ray-Inactivated Bacteriophage: I. Inactivation by Direct Effect. J. D. Watson.—p. 697.
Development of Tyrosine-Independent Strains of Lactobacillus Arabinosus. A. P. James.—p. 719.
Pantothenate Studies: I. Interference by d-Serine and l-Aspartic Acid with Pantothenate Synthesis in Escherichia Coli. W. K. Maas and B. D. Davis.—p. 733.
Sarcosine Oxidase in Adapted and Unadapted Cultures of Strain of Pseudomonas Aeruginosa. F. Bernheim.—p. 767.

Journal-Lancet, Minneapolis

70:455-498 (Dec.) 1950

Retraining Patients with Brain Damage. J. R. Brown.—p. 455.
*Subarachnoid Hemorrhages and Intracranial Aneurysms. L. A. French and P. S. Blake.—p. 459.
Some Aspects of Pathologic Physiology of Lung Edema. S. Zinberg. —p. 467.
Chronic Pyelonephritis and Hypertension. E. J. Tanquist and E. E. Emerson.—p. 472.
Search for Therapeutically Useful Parasympathomimetic Compounds. E. H. Sakal.—p. 474.
Minnesota Reports Cancer. D. S. Fleming and B. Wolcyn.—p. 480.

Subarachnoid Hemorrhages and Intracranial Aneurysm.—From their observations on 69 patients with subarachnoid hemorrhage and 18 additional patients with intracranial vascular abnormalities, French and Blake draw the following conclusions: 1. An arterial aneurysm is the causative agent in the majority of patients with subarachnoid hemorrhage. 2. The mortality rate for the primary and recurrent hemorrhages is approximately 80 per cent if no attempt is made to eradicate the aneurysm. 3. An attempt should be made to locate and surgically eradicate the aneurysm as soon after the hemorrhage as the patient's general condition will permit. A delay of more than two weeks after the hemorrhage invites disaster because of the greater frequency of recurrent hemorrhage at that time. 4. Relatively poor general condition of a patient is not a contraindication for angiography. 5. Intracranial aneurysms can be treated surgically with much success.

Laval Médical, Quebec

15:1301-1448 (Dec.) 1950. **Partial Index**

Curarizing Action of C^{10} in Otorhinolaryngology and in Ophthalmology. F. Hudon and J. P. Déchêne.—p. 1301.
Treatment of Acute Pancreatitis. J. T. Michaud.—p. 1314.
*Therapeutic Pneumoencephalography in Persons with Retarded Development. J. C. Miller and J. Delage.—p. 1326.

Pneumoencephalography in Retarded Persons.—Miller and Delage subjected 19 retarded children and adolescents between the ages of 8 and 18 years and one woman aged 29 to therapeutic pneumoencephalography followed by an intraspinal injection of 25 mg. of thiamine (vitamin B_1). Ten of the children and adolescents were idiots or imbeciles with intelligence quotients below 40, while the remaining nine were feebleminded persons with intelligence quotients between 40 and 66. The woman was an imbecile and since childhood has had sporadic epileptic attacks and paresis of the left hand. There was improvement of behavior and character in four of the 10 children and adolescents of the first group and in five of the nine children and adolescents of the second group. There was also an increase in growth and in weight. The intelligence quotient remained approximately the same, except for slight improvement in five. No physical or mental improvement resulted from treatment in the woman. No accident or serious incident occurred during or after the therapeutic procedure. The mode of action of the pneumoencephalography is not clear. The increase in growth and weight is suggestive of an effect exerted on the hypothalamus. Excitation of the diencephalon by the injected oxygen might be considered.

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1951

Medical Annals of District of Columbia, Washington.

19:663-732 (Dec.) 1950

*Penicillin Prophylaxis of Postoperative Bacteremia and Bacterial Endocarditis. P. A. Lichtman and A. M. Master.—p. 663.
Tests of Pulmonary Function. K. A. Harden.—p. 673.
Blood Coagulation and Methods of Therapeutic Control. J. J. Rheingold.—p. 677.
Symptomatic Relief of Low Back Pain. E. G. Lipow.—p. 682.
Mental Hygiene in Children. D. D. Dowd.—p. 686.

Penicillin Prophylaxis of Bacterial Endocarditis.—After demonstrating at autopsy the high incidence of heart disease and gross valvular damage in patients over 50, and after reviewing the histories of 77 patients with acute and subacute bacterial endocarditis, the authors discuss the pathogenesis of bacterial endocarditis. Their studies indicate that a large variety of manipulations and diseases that injure mucous membrane and facilitate the entrance of bacteria into the blood stream may lead to bacterial endocarditis in the presence of valvular disease. These include infections and operations in the ear, nose and throat; tooth extraction; bronchoscopy; genitourinary infections, operations and diagnostic procedures; infections of the pelvis, skin, gastrointestinal tract and bone; thrombophlebitis; pneumonia, and the exanthems. Such minor conditions as a cold, prostatic massage, enteritis and toe infection have preceded bacterial endocarditis. Since valvular lesions are common in persons over 50, although often not obvious clinically, penicillin prophylaxis prior to operation and diagnostic manipulative procedures may be instituted to obviate the development of bacteremia and bacterial endocarditis.

Nebraska State Medical Journal, Lincoln

35:369-408 (Dec.) 1950. **Partial Index**

Practical Application of Psychology in Gynecic Practice. W. R. Cooke.—p. 371.
Acute Poliomyelitis: Epidemiology, Diagnosis, Differential Diagnosis. J. H. Murphy.—p. 376.
Purpura Hemorrhagica in Gynecology and Obstetrics. W. J. Hegedus and H. E. Anderson.—p. 380.
Massive Upper Gastrointestinal Hemorrhage of Undetermined Origin. J. D. Coe and G. H. DeMay.—p. 386.

New Orleans Medical and Surgical Journal

103:227-278 (Dec.) 1950

Various Pediatric Endocrine Problems. W. A. Reilly.—p. 227.
Maternal, Fetal and Infant Mortality in Louisiana. J. S. LeMasson and J. D. Martin.—p. 234.
Sudden and Unexpected Death in Infants. C. G. Grulee Jr.—p. 243.
Friedländer Aerogenes Infections in Infancy. W. Obrinsky, R. E. Dormont and R. E. Fowler.—p. 250.
Tinea Capitis: Survey. G. Gaethe and F. C. Grieshaber.—p. 256.
Infantile Eczema. C. B. Kennedy.—p. 258.
Rocky Mountain Spotted Fever: Report of Two Cases in Louisiana. L. J. Rutledge, B. R. Clanton, M. Hood and M. H. D. Smith.—p. 261.
Practical Treatment of Diarrheas of Early Life. E. A. Socola.—p. 266.

Northwest Medicine, Seattle

49:831-910 (Dec.) 1950

Arterial Embolectomy in Elderly Cardiac Patient. R. H. Swinney and C. W. Coffen.—p. 860.
Recent Advances in Surgery. W. H. Cole.—p. 863.
Diagnosis of Silicosis. K. M. Soderstrom.—p. 866.
Rapid Diagnosis on Neurosurgical Material. C. P. Larson.—p. 869.
Value of Rapid Method Tissue Diagnosis to Neurosurgeon. J. T. Robson.—p. 872.
Hemipelvectomy, Report of Case. H. T. Buckner, B. E. McConville and J. J. Callahan.—p. 874.
Unusual Metastasis from Epidermoid Carcinoma of Nose. C. S. Campbell.—p. 876.

Ohio State Medical Journal, Columbus

46:1143-1252 (Dec.) 1950. **Partial Index**

Tobacco Smoking: Some Hints of Its Biologic Hazards. C. A. Mills.—p. 1165.
Superior Vena Cava Obstruction Due to Chronic Mediastinitis and Phlebitis. S. M. Sancetta and H. E. McDonald.—p. 1173.
Accidental Vaccination: Report of Three Cases in Adults with Severe Generalized Vaccinia in One Case. H. Wain and W. H. Buker.—p. 1176.
Prevention and Treatment of Deafness in Childhood. H. C. Rosenberger.—p. 1180.
Cancer of Tongue. A. G. James.—p. 1184.
Unilateral Hodgkin's Granuloma, Cause of Sudden and Unexpected Death. W. Kulka.—p. 1186.

Philippine Medical Association Journal, Manila

26:475-518 (Oct.) 1950

Smallpox Outbreak in Mindoro. F. Arenas, M. M. Aycardo and A. H. Cruz.—p. 475.
Critical Study of Quantitative Kahn Test (Blood) in 100 Cases of Yaws. G. Sepulveda Jr. and L. M. Ibarra.—p. 487.
Susceptibility of Filipino Children to Diphtheria. E. Stransky and N. S. Felix.—p. 491.
Report on Typical Case of Arthritis Deformans. F. V. D'Bayan and A. A. Floresca.—p. 497.
Cases of Anthrax Caused by Ingestion of Suspected Carabao Meat. M. J. Corpus and C. Quirino Jr.—p. 503.

Postgraduate Medicine, Minneapolis

8:439-532 (Dec.) 1950

Alternans: Report of Case Associated with Acute Pericarditis. E. F. Traut.—p. 439.
Intravenous Procaine: Evaluation of Some of Its Uses. R. M. Kerr and W. F. Brehm.—p. 444.
Surgical Problems in Breast Cancer. F. E. Adair.—p. 454.
Differential Diagnosis of Enlargements of Kidney. H. L. Kretschmer.—p. 466.
Treatment of Kraurosis Vulvae. R. B. Greenblatt.—p. 471.
Terminal Ileum Duplex. D. U. McGregor.—p. 479.

Psychiatric Quarterly, Utica, N. Y.

24:645-876 (Oct.) 1950

Modern Trends in Psychiatry. W. Overholser.—p. 645.
Father Time: II. J. A. M. Meerloo.—p. 657.
Family Taint and Response to Treatment in Functional Disorder: Preliminary Report. H. Zolan and N. Bigelow.—p. 672.
Survey of Mental Hygiene Clinic—21 Months of Operation. M. J. Tissenbaum and H. M. Harter.—p. 677.
Self-Dedication of Psychoneurotic Sufferer to Hostile Protest and Revenge. I. de Forest.—p. 706.
Spontaneous Remission of Schizophrenic Psychoses Following Maternal Death: Report of Three Cases. M. Cohen and L. M. Lipton.—p. 716.
Presumptively Telepathic Incidents During Analysis. J. Ehrenwald.—p. 726.
*Rorschach Study of Group of Medical Students. H. B. Molish, E. E. Molish and C. B. Thomas.—p. 744.
Involutional Death Reaction. P. S. Milici.—p. 775.
Anxiety Syndrome in Alcoholism. E. Y. Williams.—p. 782.
Techniques and Dynamics of Multiple Psychotherapy. R. Dreikurs.—p. 788.
*Observations and Opinions Concerning Complications and Contraindications in Electric Convulsive Therapy. R. L. Williams and S. E. Barrera.—p. 800.

A Rorschach Study of Medical Students.—The group of subjects chosen for this study comprised 60 students who took a Rorschach test in 1948 during their fourth year in Johns Hopkins Medical School. All but four of the subjects were men. Their Rorschach scores were analyzed and compared with those of various groups of superior adults reported by other investigators. In the intellectual sphere the students were similar to other superior adults in productivity, intellectual drive and organizational energy, form accuracy and originality of interest content; they differed from other superior adults in the overemphasis on rare detail in the test figures. In the affective sphere these medical students resembled other superior adults in richness of sources of energy available for adjustment. They were unusual in the frequency with which both shading and color shock were noted. The experience balance of the medical students showed half the total group to be introversive, while a quarter were extratensive and a quarter were approximately ambiequal. The authors feel that the large number of cases in which introversion is present need not be interpreted as unhealthy. Introversion may be constructive if the respect for reality is maintained, as it is in this group. The significance of various other Rorschach variables in the personality structure of medical students is discussed.

Complications in Electric Convulsive Therapy.—Williams and Barrera evaluate complications of and contraindications to electric convulsive therapy by an analysis of complications reported in the literature and of their experience in about 14,000 treatments. They conclude that there now appear to be fewer contraindications than were accepted in the earlier days of this therapy. Definite contraindications include congestive heart failure, recent myocardial infarctions and aneurysm of the aorta. The condition may be aggravated in cases of recent cerebral vascular accidents, acute respiratory infections and

active peripheral vascular disease. In patients with recent fractures, the use of curare is required with shock therapy. Psychiatric contraindications are inconclusive. It is necessary to evaluate the psychiatric indications for convulsive therapy in each case and to decide whether they outweigh any coexisting disorder that might increase the risk of treatment.

Psychoanalytic Quarterly, Albany, N. Y.

19:393-642 (Oct.) 1950. **Partial Index**

Infant Memories and Constructions. M. Schmideberg.—p. 468.
*Analysis of Therapeutic Factors in Psychoanalytic Treatment. F. Alexander.—p. 482.
Development of Transference. I. Macalpine.—p. 501.
On Preconscious Mental Processes. E. Kris.—p. 540.
Œdipus Trilogy. M. Kanzer.—p. 561.

Therapeutic Factors in Psychoanalysis.—Alexander says that opinions still differ concerning (1) the relative therapeutic value of the patient's intellectual insight into the origin and nature of his neurosis, (2) the relative value of emotional discharge (abreaction), (3) the role of emotional experiences during the transference, (4) the role of parallel experiences in life and (5) the significance of the time factor (frequency of interviews and length of the treatment). The author emphasizes the need for reevaluation of the psychodynamic factors operative during treatment. He is of the opinion that the corrective emotional experience that the patient obtains in the transference is the dynamic axis of psychoanalytic therapy. The significant factor is not only that the patient relives his original conflict in his relation with the analyst, but that the analyst's reactions should correct the pathogenic effects of the parental attitudes. The objective attitude of the analyst is so different from that of the parents that this alone necessitates a change in the patient's original attitudes. If the analyst succeeds in reconstructing the original pathogenic parental attitude, he may facilitate the occurrence of corrective emotional experiences by assuming an attitude opposite to that which prevailed in the past. The corrective emotional experience is the most powerful factor in making the patient's original ego defenses unnecessary. It helps the patient's ego to assume a different attitude toward repressed or inhibited impulses. Other measures serve to keep the transference on an optimal level, such as change in the frequency of interview according to the state of the analysis. Flexibility is preferable to routine. Since the personality of the analyst and his sex are of great importance, the selection of an analyst requires special consideration. A careful reexamination of the therapeutic process is urgently needed.

Psychosomatic Medicine, New York

12:343-420 (Nov.-Dec.) 1950

Psychodynamic and Esthetic Motivations for Plastic Surgery. G. Hill and A. G. Silver.—p. 345.
Role of Denial in Acute Postoperative Affective Reactions Following Removal of Body Parts. V. H. Rosen.—p. 356.
Symptom Specificity and Bodily Reactions During Psychiatric Interview. R. B. Malmo, C. Shagass and F. H. Davis.—p. 362.
Psychophysiologic Relationship of Asthma and Urticaria to Mental Illness. D. H. Funkenstein.—p. 377.
Personality Factors in Neurodermatitis: Preliminary Study. M. E. Allerhand, H. G. Gough and M. L. Grais.—p. 386.

Review of Gastroenterology, New York

17:981-1112 (Nov.) 1950

Tumors of Esophagus Below Mucosa and Their Roentgenological Differential Diagnosis. R. Schatzki and L. E. Hawes.—p. 991.
Chronic, Nonicteric Hepatomegaly with Dyspepsia. M. B. Handelsman, I. R. Schwartz and M. Perlmutter.—p. 1015.
Pancreatic Lesions in Hodgkin's Disease. A. Rottino and C. A. Crown.—p. 1033.
Mesenteric Thrombosis of Midjejunum with Resection and Recovery (Case Report). J. S. Licha and L. M. Rosati.—p. 1037.
Gastroileostomy Following Subtotal Gastrectomy. C. Windwer and D. Farber.—p. 1040.
Esophageal Dysphagia, Associated with Gallbladder Disease. M. Feldman.—p. 1044.
Hemochromatosis. I. A. Feder, L. Gitman and J. B. Hoffman.—p. 1048.
Results of Peptic Ulcer Treatment with Protein Supplements. L. M. Morrison.—p. 1058.
Psychosomatic Proctology. A. J. Cantor.—p. 1068.
Corticodiencephalic Gastrointestinal Syndromes in Epileptics (Part XI). T. S. P. Fitch, A. W. Pigott and S. M. Weingrow.—p. 1075.

Texas State Journal of Medicine, Fort Worth

46:867-932 (Dec.) 1950

Malignancy of Lungs: I. Value of Bronchoscopy. G. S. McReynolds.—p. 872.
Id.: II. Pathology. P. Brindley.—p. 874.
Id.: III. Place of Anesthesiology. H. C. Slocum and C. R. Allen.—p. 875.
Id.: IV. Role of Thoracic Surgery. A. W. Harrison.—p. 877.
Tuberculosis Surveys in Texas: Experiences in San Antonio. H. E. Smith.—p. 881.
Mediastinal Masses Discovered by Mass Photofluorography. W. S. Brumage.—p. 883.
Primary Carcinoma of Lung in Texas. R. H. Rigdon and P. Brindley.—p. 885.
Idiopathic Spontaneous Pneumothorax: Etiologic Consideration. R. A. Wise.—p. 889.
Subphrenic Abscess. W. M. Palm.—p. 894.
Roentgen Diagnosis of Diaphragmatic and Adjacent Lesions. L. R. Sante.—p. 902.
Variations of Normal Skull. R. W. Burford.—p. 910.
Brain Abscess Due to Nocardia Asteroides: Report of Case. K. Eckhardt and J. Pilcher.—p. 915.

Union Médicale du Canada, Montreal

79:1243-1382 (Nov.) 1950. **Partial Index**

Streptomycin Therapy of Tuberculosis in Infants. R. Debré, P. Mozziconacci, H. E. Brissaud and others.—p. 1246.
Chloramphenicol (Chloromycetin®) in Treatment of Typhoid Fever in Children. G. Mouriquand, N. Boulez and Miloutinowitch.—p. 1250.
Primary Cancer of Pleura in Children. P. Giraud, R. Bernard and J. Coignet.—p. 1254.
*Antidiphtheritic Vaccination. G. Lapierre.—p. 1265.

Antidiphtheritic Vaccination.—According to Lapierre, active immunization against diphtheria was started in Canada on 50 children in 1922. Toxin-antitoxin mixtures were used at this time, and a small proportion of severe reactions was observed. From 1926 onward, Ramon's diphtheria toxoid, a preparation of diphtheria toxin that had been modified by the addition of from 3 to 4 per cent commercial solution of formaldehyde followed by incubation at from 38 to 40 C. during four to six weeks, was used with a minimum of mild reactions. The number of persons vaccinated in Canada reached 500,000 in 1928. Vaccination should be done during the second half of the first year of life. Three doses of 1 cc. of the toxoid should be given at intervals of five weeks to two months according to the case. Experience showed that 99 of 100 persons who had positive reactions to Schick tests before the vaccination were immunized, as shown by a subsequently negative reaction. The mortality rate of diphtheria, which was 48.7 per 100,000 of population in the city of Montreal in 1900, was only 0.3 in 1949. The morbidity rate of diphtheria, which was 247.2 per 100,000 in Montreal in 1927, was only 4.5 in 1949. A total of 356,630 children were immunized against diphtheria in Montreal during the period 1928-1950.

West Virginia Medical Journal, Charleston

46:337-368 (Dec.) 1950

The Alarm Reaction: Its Relation to Origin and Antihistamine Therapy of Common Cold. J. M. Brewster.—p. 337.
Treatment of Alcoholism with Antabuse (Tetraethylthiuramdisulfide). V. E. Mace.—p. 343.
Cancer of Stomach: Review of Cases Treated at the Myers Clinic Hospital from July 26, 1933 to May 1, 1950. J. E. Summers.—p. 345.
Prolonged Relief from Dysphagia Following Dilation of Esophageal Carcinoma (Report of Case). E. B. Mewborne and P. P. Vinson.—p. 348.
Study of Q-T Interval in the Adult Male. D. V. Hatton.—p. 349.

Wisconsin Medical Journal, Madison

49:1089-1252 (Dec.) 1950

Cystic Dilatation of Ductus Choledochus. J. W. Gale and M. G. Peterson.—p. 1108.
Suicide: Implications for the General Medical Man. C. L. Kline.—p. 1111.
Infection Caused by Schistosoma Haematobium: Report of Two Cases. E. F. Cummings.—p. 1114.
Intussusception in a Four Month Old Infant: Report of Case. W. B. A. J. Bauer.—p. 1117.
Present Day Treatment of Gonorrhea. P. C. Gatterdam.—p. 1119.
Present Day Treatment of Chancroid, Lymphogranuloma Venereum, and Granuloma Inguinale. R. J. Rowe.—p. 1120.
Current Concepts of Cirrhosis. J. L. Sims.—p. 1123.
Wolff-Parkinson-White Syndrome: Report of Case Illustrating Also Post-Tachycardia Syndrome. D. M. Buchman.—p. 1127.

V 14
1951

FOREIGN

British Journal of Ophthalmology, London

34:577-644 (Oct.) 1950

Regional Variations of Extrafoveal Perception of Form in Central Visual Fields (Photopic Vision) with Special Reference to Lesions of Visual Pathways. S. Renfrew.—p. 577.
Intramural Vessels and Endothelial Cells in Walls of Sclerosed Retinal Arteries. A. Loewenstein.—p. 594.
Comparative Study of Coal Miners' Nystagmus. R. C. Browne, I. F. Beck and E. G. Saint.—p. 601.
Keratoglobus and Keratoconus: Contribution to Nosological Interpretation of Keratoglobus. V. Cavara.—p. 621.
Aureomycin in Trachoma. A. J. Boase.—p. 627.
Case of Leiomyoma of Iris. A. Stanworth.—p. 633.

British Journal of Radiology, London

23:685-748 (Dec.) 1950. **Partial Index**

Radiology of War Injuries, Part VI: Wounds of Face and Jaw. D. B. McGrigor and W. Campbell.—p. 685.
Relationship of Nature of Opaque Medium to Small Intestine Radiographic Pattern. G. M. Ardran, J. M. French and E. H. Mucklow.—p. 697.
Factors Influencing Mediastinal Shadow in Young Children. F. H. Kemp.—p. 703.
Calcification in Patent Ductus Arteriosus. H. Ruskin and E. Samuel.—p. 710.
Dosage Nomograms for Short Life Radioactive Substances. R. G. Mitchell.—p. 740.

British Medical Journal, London

2:1293-1346 (Dec. 9) 1950

Lessons for Future Treatment from 472 Fatalities in Diabetic Children. E. P. Joslin and J. L. Wilson.—p. 1293.
Erythrocyte Sedimentation in Anaemia. R. Terry.—p. 1296.
Psychological Treatment in Skin Disorders with Special Reference to Abreactive Techniques. H. J. Shorvon, A. J. Rook and D. S. Wilkinson.—p. 1300.
Heredity and Leg Ulcers. S. T. Anning.—p. 1305.
Treatment of Post-Phlebitic Leg and Application of Venous-Pressure Measurement. A. J. Walker.—p. 1307.
Use of Decamethonium Iodine in Anaesthesia for Peroral Endoscopy. C. F. Scurr.—p. 1311.

2:1347-1404 (Dec. 16) 1950

Appendicitis. C. Wakeley and P. Childs.—p. 1347.
Care of the Tuberculous in the Home. F. R. G. Heaf.—p. 1353.
Content of Haemopoietic Factors in Liver Extracts: Relationship to Clinical Response. R. H. Girdwood and K. M. Carmichael.—p. 1357.
*The Manubrio-Sternal Joint in Rheumatoid Arthritis. A. Bogdan and J. Clark.—p. 1361.
Erythema Nodosum as Initial Manifestation of Boeck's Sarcoidosis. F. E. Crawley.—p. 1362.
Cardiological Case Finding by Means of Mass Miniature Radiography. P. O. Leggat.—p. 1364.
Unusual Case of Tuberous Sclerosis. A. J. N. Warrack.—p. 1367.

The Manubriosternal Joint in Rheumatoid Arthritis.—Bogdan and Clark describe five cases to show that rheumatoid involvement of the manubriosternal joint is not uncommon. The first patient had had rheumatoid arthritis with involvement of feet, wrists, fingers and right elbow for five years. The manubriosternal joint became painful two years after the onset of the disease, and there was swelling and tenderness over it. The attacks of pain lasted two to three days. The second patient gave a 22 year history of rheumatoid arthritis, starting with pain, swelling and tenderness over the manubriosternal joint, which had lasted for one month only and had not recurred. The third patient had had swelling, aching and stiffness in some fingers for a year and for three weeks prior to attending the clinic she had experienced a constant tight sensation over the front of the chest, in the region of the manubriosternal joint, aggravated by deep inspiration and yawning. She had no cough or other chest symptoms. There was tenderness over the manubriosternal joint. In one of the two remaining patients, the manubriosternal pain occurred in attacks lasting up to 24 hours and was aggravated by yawning and coughing. A striking feature of the pain was its tendency to occur on exertion. This pain, which had the same quality as the arthritic pains in other parts of the body, was relieved by acetylsalicylic acid (aspirin).

An asterisk (*) before a title indicates that the article is abstracted. Single case reports and trials of new drugs are usually omitted.

Journal of Endocrinology, London

7:1-102 (Nov.) 1950

Significance of Lymphadenoid Changes in Thyroid Gland. R. Greene.—p. 1.
Ovarian Hormones and Calcium Metabolism. J. Duckworth and G. M. Ellinger.—p. 7.
Effects of Oestradiol on Rat Uterus. D. F. Cole.—p. 12.
Variability in Response of Symphysis Pubis of Guinea Pig to Relaxin. R. V. Talmage and W. R. Hurst.—p. 24.
Recovery from Oestrogen-Induced Sterility in Albino Mice. C. W. Emmens.—p. 31.
Galactopoietic Effect of Iodinated Casein: Dose Response Relationships During Prolonged Treatment. F. B. Leech.—p. 42.
Effect of Oestrone and Progesterone on Histological Structure of Symphysis Pubis of Castrated Female Mouse. K. Hall.—p. 54.
Rickets and Osteoporosis in Xenopus Laevis. H. M. Bruce and A. S. Parkes.—p. 64.
Effect of Varying Levels of Thyroidal Stimulation on Adrenals Under Different Environmental Temperatures. M. Maqsood.—p. 82.
Vascular Structure of Extra-Placental Uterine Mucosa of Rabbit. H. J. Parry.—p. 86.
Pregnancy in Insulin-Treated Alloxan Diabetic Rats. P. Ferret, O. Lindan and M. E. Morgans.—p. 100.

Journal of Laryngology and Otology, London

64:687-730 (Nov.) 1950

Review of Diagnostic Problem in 100 Cases of Chronic Maxillary Sinusitis. R. T. Hinde.—p. 687.
Attic Suppuration. F. McGuckin.—p. 693.
Attic Suppuration. G. S. Seed.—p. 700.
Voice Strain. H. St. John Rumsey.—p. 708.
Abnormalities of Upper Respiratory Tract in Kartagener's Syndrome. T. M. Banham.—p. 714.
Herpes Laryngis. D. A. Draffin.—p. 717.
*Deafness and Erythroblastosis Foetalis. K. Hazell.—p. 720.

Deafness and Erythroblastosis Fetalis.—Hazell gives an account of a case of deafness that appears to have been caused by kernicterus at birth. The patient, now aged 19, has one younger and two older sisters. The family history is a classic one of familial jaundice caused by an Rh-positive father and an Rh-negative mother. Since there is no history of deafness in the family and since the patient evidently had kernicterus at birth but did not receive blood transfusions as did her sisters, the conclusion can reasonably be drawn that the patient's deafness was caused by the kernicterus. It is suggested that the deafness is probably due to lesions of the cochlear nuclei, though lesions of the inferior quadrigemina, the internal geniculate body and, possibly, the cerebral cortex cannot be ruled out. The patient's mental age is far below normal, amounting to mental dulness with educational defect.

Lancet, London

2:721-780 (Dec. 9) 1950

The Changing Face of Surgery. C. Wakeley.—p. 721.
The Patient and His Disease. A. E. Clark-Kennedy.—p. 723.
Observations on Prozone Phenomenon Encountered in Using Anti-Globulin Sensitisation Test. J. J. van Loghem, M. Kresner, R. R. A. Coombs and G. F. Roberts.—p. 729.
*Gamma Globulin in Prevention and Attenuation of Measles: Controlled Trials in Day and Residential Nurseries. A Report to the Medical Research Council.—p. 732.
Sterility Due to Congenital Absence of Vasa. B. Sandler.—p. 736.
*Aplasia of Vasa Deferentia as Cause of Sterility. G. L. Foss and A. Miller.—p. 737.
Liquefaction of Viscous Purulent Exudates by Deoxyribonuclease. J. B. Armstrong and J. C. White.—p. 739.
Histology of Endometrium in "Organic Uterine Haemorrhage." A. M. Sutherland.—p. 742.

Gamma Globulin in Measles.—The trials described in this report were carried out on behalf of the Medical Research Council of Great Britain. To assess the value of gamma globulin in the prevention and attenuation of measles it was necessary to compare the experience of the children given gamma globulin with a similar group of children not so treated, and it was decided to inoculate the second group with 5 milliliters of adult serum or reconstituted dried plasma. For convenience,

both adult serum and reconstituted dried plasma are called "adult serum" in this report. In a series of controlled trials in day nurseries, gamma globulin was given in 225 to 450 mg. doses to 212 susceptible measles contacts between the ages of 6 months and 5 years. Measles developed in 31.6 per cent, and 94 per cent of these had excellent or satisfactory reactions. Adult serum was given in 5 milliliter doses to 215 contacts of similar age and exposure; measles developed in 57.2 per cent, and 48.9 per cent of these showed doubtful or no evidence of modification. The attack rates for children receiving 225-300 mg. and 450 mg. of gamma globulin were 33.7 per cent and 21.6 per cent respectively; whereas in the corresponding groups of children receiving 5 milliliters of adult serum the rates were 55.4 per cent and 65.8 per cent. The duration of passive immunity depended on dosage; with the larger dose some protection for periods up to six weeks was observed. Reactions to the prophylactic injections in the trial were minimal and unimportant. No serious complications were observed in the globulin group. In view of the complexity and cost of producing human gamma globulin it probably will have to be reserved for contacts in hospitals and for children whose health is such that an attack of measles would endanger their life. For general use, adult serum or plasma will still have to be relied on.

Aplasia of Vasa Deferentia as Cause of Sterility.—In the routine investigation of 200 cases of male infertility 37 patients (18 per cent) were found to have complete azoospermia. Bilateral aplasia of the vas was the cause in three of these, who were otherwise normal. This is an incidence of 1.5 per cent in the total series and 8 per cent in the patients with azoospermia. Excluding from the 37 patients 21 who had testicular agenesis, bilateral cryptorchism, tuberculous epididymitis or atrophy following surgical intervention for undescended testes, there remain 16 who had testes of normal size on clinical examination. Among these the incidence of bilateral aplasia of the vas deferens was 18 per cent. The authors believe that if careful search were made for the condition, it would probably prove to be a commoner cause of absolute sterility than is suggested by the number of published reports.

2:781-832 (Dec. 16) 1950

Clinical Medicine. F. M. R. Walshe.—p. 781.
Adjuvants to Streptomycin in Treating Tuberculous Meningitis in Children. I. A. B. Cathie and J. C. W. MacFarlane.—p. 784.
*Treatment of Acute Barbiturate Poisoning: Comparison of Nikethamide and Amphetamine. J. Riishede.—p. 789.
Rate of Red-Cell Exchange in Replacement Transfusions. N. Veall and P. L. Mollison.—p. 792.
Simple Papillomata of Bladder: Review of 175 Consecutive Personal Cases from St. Paul's Hospital, London, and St. John's Hospital, Lewisham. H. P. Winsbury-White, D. St. C. L. Henderson and R. D. Wilkins.—p. 797.
*Aureomycin and Chloramphenicol in Whooping-Cough. J. D. Gray.—p. 800.
Treatment of Typhoid Fever* with Chloramphenicol. C. F. L. Hill, J. V. Armstrong, C. K. McDonald and E. N. Allott.—p. 802.
Chloramphenicol in Subacute Bacterial Endocarditis. M. Curtin.—p. 804.

Treatment of Acute Barbiturate Poisoning.—The relative effectiveness of nikethamide and amphetamine was studied in 193 cases of acute barbiturate poisoning. Mild cases requiring no stimulation were not included. In the first 61 of the 193 cases, nikethamide (2 to 5 Gm. per hour) served as the stimulant, whereas in the subsequent 132 cases, amphetamine (generally 50 mg. per hour) was given. Otherwise, the two series were treated similarly, i. e., by aspiration of the stomach and instillation of activated charcoal, stimulation of peristalsis with neostigmine, prophylactic measures to prevent pneumonia, the administration of parenteral fluid and antishock treatment. The two last-mentioned therapeutic measures were given when judged necessary. Of the 61 patients in the nikethamide series, 27 (44 per cent) died; the mortality for the 43 "severe" cases was 63 per cent. Of the 132 patients in the amphetamine series, 12 (9 per cent) died; the mortality for the 58 "severe" cases was 21 per cent. The patients who were treated with amphetamine were in better condition than those treated with nikethamide. Pressor and other untoward effects were fewer. Hence it must be said that in the treatment of acute barbiturate poisoning amphetamine is far more effective than nikethamide.

Aureomycin and Chloramphenicol in Whooping Cough.—A preliminary survey of the effects of chloramphenicol in whooping cough did not lead to definite conclusions because the cases were too few. When this year's epidemic began, the investigation was reopened and was extended to include a trial of aureomycin. The children were treated as hospital outpatients but were seen daily except on week ends. The mothers kept a written record of the number of paroxysms of all types. No child was accepted for the trial unless three of the following four diagnostic criteria were present: (1) absolute lymphocytosis; (2) normal erythrocyte—sedimentation rate; (3) paroxysm observed during a visit to the hospital, and (4) isolation of Haemophilus pertussis from a postnasal swab. The patients were all started on four-hour doses of a chocolate milk-sugar powder, which was almost indistinguishable from one of the forms of aureomycin used. Between the third and fifth days, when the diagnosis was fully established, the patients chosen for antibiotic treatment were changed to either aureomycin or chloramphenicol, which was continued for five days, after which they returned to the placebo powder and continued with this until their discharge. No child with a history of more than 20 days' illness was given antibiotic treatment. The results obtained suggest that both aureomycin and chloramphenicol are effective in whooping cough. The observations with chloramphenicol confirm the apparent cures obtained at the same hospital in the pilot trial. Both antibiotics are effective in reducing the number of paroxysms per day, but chloramphenicol also lessens the whooping and vomiting and loosens the cough. Children receiving aureomycin in powder form develop a voracious appetite.

Medical Journal of Australia, Sydney

2:709-744 (Nov. 11) 1950

Survey of Human Brucellosis in Queensland. E. H. Derrick and H. E. Brown.—p. 709.
Some Veterinary Aspects of Prevention of Brucellosis. A. K. Sutherland.—p. 715.
Incidence of Tuberculous Infection. Report of Epidemiological Survey of Australian Capital Territory and Queanbeyan. M. G. Pinner.—p. 717.
Australian Leptospiroses. D. W. Johnson.—p. 724.

2:745-776 (Nov. 18) 1950

*"Q" Fever in South Australia: I. Isolation of Causative Organism from Four Cases and Its Identification as Rickettsia Burneti.—J. Stokes.—p. 745.
Indications for and Results of Acromionectomy. F. H. McClements Callow and C. M. Maxwell.—p. 750.
Surgery in the Field. P. Row.—p. 755.
Aviation Medicine: Its Scope and Application. L. Rait.—p. 757.
Tuberculin in Diagnosis and Treatment. G. Griffiths.—p. 760.

Q Fever in South Australia.—Since Derrick's description of Q fever in Australia in 1937, this disease has not been described in any state in Australia other than Queensland. Stokes now records an outbreak which occurred amongst abattoir workers in South Australia in the summer of 1947-1948. Several of these workers contracted an unidentified acute febrile illness and were admitted along with five other patients to the Royal Adelaide Hospital where Q fever was proved serologically. Blood samples, either defibrinated or clotted, received from the three patients were inoculated into both guinea pigs and mice. Observations on these animals are described. Suspensions from the spleens of these animals were inoculated into chick embryos. Only the most severely infected yolk sacs were used in subsequent passages, and by the seventh passage heavy infection was established. In the course of these investigations infections occurred in three laboratory workers. None of these infections was severe, fever lasting from four to five days. Blood samples were taken on either the first or the second day, and inoculation was carried out as before. Rickettsia burneti was isolated from the blood of two hospital patients and from two patients with laboratory infection. The author also describes the preparation of antigens from infected yolk sacs and the preparation of immune serum in guinea pigs.

V 14
1951

Acta Chirurgica Belgica, Brussels

49:747-858 (Nov.) 1950. **Partial Index**

*Segmental Resection of Lung for Bronchiectasis. J. Mathey and J. Toussaint.—p. 747.
Graft of Aorta with Its Bifurcation in Dogs. J. Dalem.—p. 759.
Contribution to Knowledge of Physiopathology of Intestinal Obstruction. F. Howet.—p. 778.

Segmental Resection of Lung.—Mathey and Toussaint performed segmental resection of the lung for bronchiectasis in 31 patients. Twenty-five had unilateral lesions and six had bilateral lesions. Sixty-one lung segments were removed. The operation was performed according to the technics of Chamberlain and Overholt, and the latter's technic, revised in 1949, was employed in the authors' most recent cases. There were no operative deaths. Two patients died two months and two years respectively after the operation, but their deaths were not related to the type of intervention. There was a high incidence of complications, with atelectasis occurring in 18 cases, bronchial fistulas in six cases and empyema in three cases, but the authors feel that with improved technic the sequelae were less pronounced and the results improved. The severity of certain complications depends more on the nature of the patient's lesions than on the type and the extent of the operation. An association of bronchiectasis with tuberculosis seems to be particularly unfavorable. Segmental resection is indicated when bronchograms of good quality show such extensive lesions that every uninvolved portion of the lung must be spared, or when the distribution of the lesions would make typical lobectomy too extensive. Highly satisfactory results, with complete disappearance of expectoration and great improvement of the general condition were obtained in 18 of the 23 surviving patients with unilateral lesions; moderate improvement was obtained in one patient, and four were therapeutic failures. Unilateral intervention was successful in three of the six patients with bilateral lesions, while results were incomplete in two. Bilateral segmental resection gave a satisfactory result in the one patient on whom it was performed, but in general the results seemed to be more favorable in those with more localized unilateral bronchiectasis.

Archiv für Kinderheilkunde, Stuttgart

140:65-112 (No. 2) 1950

Pathogenesis of Laryngospasm in Nurslings: Problem of Sudden Death in Spasmophilic Infants. R. Garsche.—p. 65.
Initial Decrease in Isohemagglutination in Children with Toxic Diphtheria. T. Hockerts and J. Ströder.—p. 82.
*Observations on Influence of Folic Acid on Course of Celiac Disease. R. Filsinger and K. H. Kimbel.—p. 98.

Folic Acid and Celiac Disease.—Filsinger and Kimbel give the histories of two children with severe forms of celiac disease (Herter-Heubner's intestinal infantilism), who had been treated with dietetic measures for long periods, but without much success. When treatment with folic acid was instituted, first by the intravenous and then by the oral route, the weight of the children rapidly increased; the flat glucose tolerance curve, which is characteristic of celiac disease, was replaced by a normal curve, and the formerly reduced erythrocyte count rapidly increased to normal values. The children became much livelier and more cooperative; their appetite improved, the stools became formed, decreased in number and became free of starch and neutral fats.

Archivum Chirurgicum Neerlandicum, Arnhem

2:97-200 (No. 2) 1950. **Partial Index**

Solitary Brain Metastases. C. H. Lenshoek.—p. 99.
Resection of Rectum for Cancer. J. F. Nuboer.—p. 111.
*Postoperative Shock Not Accompanied with Hemoconcentration. G. A. Schoemaker.—p. 134.
*Congenital Stricture of Trachea and Esophagus by Double Aortic Arch. J. Exalto, W. K. Dicke and W. C. Aalsmeer.—p. 170.
*Tendovaginitis Stenosans (de Quervain's Disease). H. Muller.—p. 188.

Postoperative Shock and Hemoconcentration.—Schoemaker stresses that hemoconcentration plays no part in postoperative shock as such. Research in the field of postoperative metabolic disorders has convinced him that two main groups should be distinguished. The first group of disorders occurs in patients with all forms of ileus, including cases of intestinal paralysis due to peritonitis. This metabolic disorder resembles uremia due to salt depletion and is characterized by high blood urea, low chloride content of the blood, with a shifting of the chloride ion from the red blood corpuscles to the plasma, increased alkali reserve and alkalosis. Salt and water are both deficient and hemoconcentration results. In the second form, in true postoperative shock, the urea content of the blood is slightly increased; the chloride content is almost normal, with a shifting of the chloride to the erythrocytes, and the alkali reserve is reduced. There is acidosis and no hemoconcentration but rather a dilution of the blood. The great difference between the two conditions can be demonstrated by investigation of the acid-base equilibrium. Acidosis prevails in postoperative shock, whereas the shock accompanying intestinal obstruction is characterized by alkalosis.

Constriction of Trachea and Esophagus by Double Aortic Arch.—Exalto and associates give the histories of three infants, from 5 to 10 months old, who had congenital stridor due to constriction of the trachea and esophagus by a double aortic arch. All three were successfully operated on. Excellent illustrations clarify the descriptions.

Tendovaginitis Stenosans (de Quervain's Disease).—Muller briefly reviews the literature on stenosing tendovaginitis and describes cases of his own observation. He shows that the disease is comparatively frequent and that it may produce complete disability. It is caused by chronic trauma of the sheath of the tendons of the extensor pollicis brevis and the abductor pollicis longus. Although operative treatment is simple and has been completely successful in a large proportion of cases, this therapy is little known. The anatomy, pathology and etiology of the disease are discussed. On the basis of eight personally observed cases the author concludes that results are better with removal, rather than with simple splitting, of a portion of the tendon sheath. Finally, a patient is discussed in whom the stenosing tendovaginitis was localized in the second and third compartment of the ligamentum carpi. This supports the view of Potter that the changes are primarily localized in the ligamentum carpi dorsale and secondarily in the tendon sheath and the tendon.

Medizinische Klinik, Munich

45:1521-1552 (Dec. 1) 1950. **Partial Index**

Treatment of Sulfonamide-Sensitive Infections in Patients with Renal Disease. H. Böttner and G. Gries.—p. 1526.
Disappearance of Anoxemia of Heart Muscle in Early Myocarditis Associated with Infectious Diseases, Obtained with Theophylline Preparations: Preliminary Report. F. Lasch.—p. 1529.
*Treatment of Bacterial Infections in Surgical Patients with Massive Doses of Penicillin in Aqueous Solution. A. von Lutzki and G. Kurow.—p. 1531.
*Double Effect of Dibenamine. W. Birkmayer and H. Kölbl.—p. 1534.

Treatment of Surgical Patients with Massive Doses of Penicillin.—Penicillin in vitro and in vivo exerts bacteriostatic, bactericidal or bacteriolytic effects depending on its concentration. Administration of more than 200,000 units of penicillin in aqueous solution is required to assure a bacteriolytic effect in a patient. More than 400 surgical patients with severe bacterial infections, such as large carbuncles, phlegmons, paronychias with tendinous and osseous involvement, necrotizing erysipelas, mastitis and postoperative bronchopneumonia were given a single daily dose of 800,000 units or two divided doses of 400,000 units of sodium penicillin G in aqueous solution by parenteral route. More recently these doses were reduced to 600,000 units daily in two divided doses of 300,000 units. Results were the same as those obtained with the usual three-hour injections or with long-acting penicillin for parenteral use. Even better clinical results were obtained with massive doses of penicillin in aqueous solution than with the usual methods in patients with carbuncles of the face, phlegmonous cholecystitis and perforative peritonitis. The burden to the patients and the nursing personnel is much less with two daily injections instead of eight. The bactericidal effect of the treatment with mas-

sive doses makes up for the lack of prolonged action, and there is no uncertainty about the absorption of effective concentration of penicillin as there is with the use of long-acting preparations. Penicillin-resistant strains do not develop. The local tolerance for aqueous solutions even of high concentration is superior to that for most of the long-acting preparations. The aqueous solution of penicillin does not exert the antagonistic effect of procaine penicillin against the sulfonamides that may be observed when the two latter drugs are employed simultaneously. The necessity for a constant penicillin level in the blood serum for 24 hours has been challenged by the reported results.

Double Effect of Dibenamine.*—Although N,N-dibenzyl-beta-chloroethylamine (dibenamine*) is known to be an effective sympatholytic drug, it was found by the authors to have the opposite effect in small doses. They demonstrated this by testing the response of 20 subjects with minor illnesses to epinephrine before and after varying doses of dibenamine.* Their normal response was first determined by measuring of the changes in blood sugar, leukocyte count, pulse rate, blood pressure and temperature 10, 20, 30, 60 and 120 minutes after the injection of 0.5 mg. of epinephrine. Then for two days each subject received 0.5 mg. of dibenamine* per kilogram of body weight daily. On the third day epinephrine was given again and the same responses were measured. The experiment was repeated with administration of 1 to 5 mg. of dibenamine* per kilogram daily and with a two day rest period between trials. It was found that after doses of 0.5 mg. per kilogram the effect of the injected epinephrine was increased, while after doses of 2 to 5 mg. per kilogram this effect was blocked. Apparently, small doses facilitate adrenergic impulses of the sympathetic nervous system, while large doses block them. The authors believe that these results cannot be explained on the basis of a purely peripheral blocking mechanism but that a central effect of the drug must be considered.

Presse Médicale, Paris

58:1353-1368 (Dec. 2) 1950

New Data on Subacute Regional Adenopathy with Spontaneous Recovery Described in 1950: Benign Lymphoreticulosis Induced by Inoculation. P. Mollaret, J. Reilly, R. Bastin and P. Tournier.—p. 1353.
*Adenoculture, Rapid and Reliable Method for Bacteriologic Diagnosis of Acute Brucellosis. M. Janbon, L. Bertrand and H. Quatrefages. —p. 1355.
*Value and Risks of Use of Neostigmine for Pregnancy Test in Gynecologic Practice. M. Dumont.—p. 1356.

Bacteriological Culture of Lymph Nodes in Brucellosis.—Bacterial cultures were obtained from the lymph nodes of 50 patients with various forms of brucellosis. Specimens obtained in 53 puncture biopsies of lymph nodes yielded colonies of Brucella melitensis in 33 instances on the third day. Contamination of the biopsy material occurred in eight instances in spite of aseptic precautions. Failure of the method in 12 cases of chronic and acute brucellosis was due to the absence of lymphadenopathy. The authors consider culture carried out from lymph nodes as the most reliable and rapid method for bacteriological diagnosis of recent, acute brucellosis in patients with enlargement of lymph nodes, even in the stage in which serum diagnosis cannot yet be made.

Neostigmine in Pregnancy Tests.—Dumont injected 0.5 mg. of neostigmine intramuscularly in 28 women, 15 of whom were pregnant 15 days to four months and 13 of whom had amenorrhea without pregnancy. The women with presumed pregnancy were given one injection every other day for three days. Results were as follows: In nine of the 15 pregnant women bleeding did not occur. In two, bleeding occurred six and eight days respectively after neostigmine was discontinued. Another pregnant woman expelled a fetus that had been dead for two months, six days after the administration of neostigmine. In two patients receiving estrogenic therapy abortion occurred within 13 and 20 days respectively after the administration of neostigmine. Abortion occurred within 14 days of administration of neostigmine in a syphilitic woman who had been pregnant for one and a half months. In 10 nonpregnant women amenorrhea of one to six months' duration was treated successfully. Two women with amenorrhea of three and 12 months' duration respectively and one woman with menopausal amenorrhea were therapeutic failures. Neostigmine is of definite therapeutic value in amenorrhea. It should be used cautiously in obstetric practice as a diagnostic test for early pregnancy, because it has been followed by abortion in a significant proportion of cases. Successfully administered in the course of amenorrhea, it occasionally may give rise to delusions of abortion in a woman anxious for child-bearing, thus causing her to mistrust her physician. This may be a serious drawback to the systematic use of the drug. On the whole, the drug is well tolerated, except for rare and insignificant malaise. It should always be used with caution in gynecologic practice.

58:1397-1412 (Dec. 16) 1950. **Partial Index**

Lyophylization, Technic with a Future. P. Hauduroy.—p. 1397.
*Combined Treatment of Experimental Syphilis with Penicillin and Bismuth. C. Levaditi and A. Vaisman.—p. 1397.

Penicillin Combined with Bismuth in Syphilis.—Levaditi and Vaisman administered to one series of rabbits with syphilitic skin lesions 16,000 units of aqueous penicillin per kilogram of body weight in eight injections in the course of two days. In another series, 1 mg. of oil-soluble bismuth per kilogram of body weight was given intramuscularly. A third series of syphilitic rabbits received both penicillin and bismuth in the same dosage and over the same period of time. The simultaneous administration of these subtherapeutic doses of penicillin and bismuth resulted in pronounced synergistic effects. When administered separately, they did not prevent recurrences and did not exert a profound sterilizing effect, but when administered simultaneously, they accomplished both these results. Additional experiments were performed on 18 rabbits with syphilitic scrotal lesions. These were given 5,000 to 10,000 units of penicillin per kilogram of body weight for five days with a total dose of 25,000 to 50,000 units per kilogram of body weight. Six of the 18 rabbits were given aqueous penicillin, and 12 were given repository penicillin, either penicillin dissolved in beta-phenylethanol (solvent P, which is not easily miscible with water) or benzyl-penicillinate of 2-(5-vinyl-quinuclidyl)-4-(6methoxy-quinolyl(carbinol (PGQ), an aqueous or oily solution of an organic salt of penicillin. The spirochetes disappeared more rapidly in the animals treated with the two long-acting penicillins than in those treated with aqueous penicillin. Cicatrization of the syphilomas was accomplished at about the same time in all 18 animals. Complete sterilization of lymph nodes occurred in all the animals treated with the long-acting penicillins, while the same effect was obtained in only two of the six animals that had been treated with aqueous penicillin. The spirochetes disappeared more rapidly in an additional series of syphilitic rabbits that were given repository penicillin and bismuth simultaneously than in those to whom these two drugs were administered separately. Complete sterilization of the blood, peripheral lymphatic system, spleen and bone marrow resulted from combined treatment with long-acting penicillin and bismuth, while only partial sterilization was obtained in animals given either of the two drugs separately. Thus combined treatment with long-acting penicillin and bismuth proved to be the most effective method of treatment of experimental syphilis in rabbits.

Revista Clínica Española, Madrid

39:1-50 (Oct. 15) 1950. **Partial Index**

*Antibodies to Rabbit Serum in Patients with Multiple Sclerosis. C. Jiménez Díaz, E. Arjona and J. M. Segovia.—p. 25.

Multiple Sclerosis.—Jiménez Díaz and collaborators found that a patient with multiple sclerosis had acute reactions to (1) the intramuscular injection of 0.1 cc. of rabbit hemolytic serum (Koréssios' treatment) and (2) the intradermal test with normal rabbit serum. The patient also had plasma precipitins for normal rabbit serum, even to minimal dilutions of the antigen. The authors examined the plasma of 20 persons for precipitins after injection of normal rabbit serum and also performed intradermal tests with the serum. The results were negative in 12 normal persons, in three patients with allergic diseases and strongly positive in four of five patients with multiple sclerosis.

V 14
1951

This seems to indicate that primary multiple sclerosis is due to the existence of certain antibodies in the plasma of those patients, which produce a series of immunologic shocks. Presumably such patients would react similarly to injections of nerve tissue extracts. The authors emphasize the importance of further researches on this subject.

39:81-140 (Oct. 31) 1950. Partial Index

*Neurological Sequelae of Rh Factor. J. de Moragas.—p. 116.

Neurological Sequelae of Rh Factor.—Moragas calls the attention of pediatrists and neurologists to a neurological syndrome that may occasionally appear in infants immediately after birth, together with jaundice. The author has observed about 20 cases. The syndrome usually appeared in a second child and only rarely in a first-born child. Usually the infant and the father were Rh positive whereas the mother was Rh negative, but in other cases the Rh incompatibility could not be proved. Most frequently the neurological syndrome consisted of choreoathetosis, extrapyramidal hypotonia or hypertonia, ataxia and dysarthria. Treatment, which was prolonged, consisted of muscular relaxation exercises, and administration of pyridoxine (vitamin B_6), pantothenic acid and, in some cases, magnesium sulfate and drugs with an effect similar to that of caramiphen hydrochloride (panparnit®). In cases of this type the late sequelae were mild, consisting of moderate ataxia, dysarthria and moderate psychomotor instability. These children were socially normal and able to get an education. In some cases the syndrome consisted of oligophrenia, oculogyric crises, convulsions, tremor, dysmetria and adiadokokinesia. The neurological sequelae were uncontrollable in cases of this type.

Ugeskrift for Laeger, Copenhagen

112:1517-1538 (Nov. 2) 1950

*Cancer of Pancreas. Clinical-Pathological Investigation. L. Thamsen, N. Hjorth, A. Rørgaard Christensen and M. Bjørneboe.—p. 1517.
Cancer of Colon: Cases Operated on. H. Brocks.—p. 1521.
Is Sympathisan New "Remedy for Rheumatism"? S. A. Jespersen. —p. 1522.

Cancer of Pancreas.—Thamsen and his associates studied 112 cases of cancer of the pancreas found in 12,447 necropsies (frequency 0.9 per cent). The cancer was localized to the head of the pancreas in half the cases and to the body or tail in 19 per cent. In 31 per cent the entire pancreas was involved. Metastases occurred in 71 per cent of the cases, invasion of surrounding tissue in 46 per cent, while in 18 per cent there were neither metastases nor invasion. The ratio between men and women was 1.9:1. Only four patients were aged under 40. Half the patients died within three months after the first symptom, and only seven lived more than nine months; 40 per cent were admitted after having had symptoms less than a month and 71 per cent within the first three months. The most constant symptom was pain, localized to the epigastrium or under the right costal margin; in only two instances was it under the left costal margin. Pain was the initial symptom in 66 cases. There was pronounced loss of weight before admission in 42 per cent of the cases, and weakness and anorexia were frequent early symptoms. Jaundice was present on admission in 40 per cent of the patients with tumor of the head of pancreas and was a late symptom in 62 per cent of all patients. Dyspeptic symptoms often characterized tumor of the head of the pancreas. During hospitalization occult bleeding was found in 61 per cent of the cases. The sedimentation reaction was increased in 88 per cent. Three fourths of the patients had a hemoglobin value of over 80 per cent on admission. Roentgenograms of stomach and duodenum showed signs of tumor of the pancreas in 13 of the 39 cases examined. Thirty-six cases were diagnosed during life, 19 of them at operation. The authors stress that diagnosis of cancer of the pancreas is suggested by jaundice in patients over 40, rapid loss of weight, occult bleeding and poor general condition without anemia. Early diagnosis can be made by determinations of the pancreatic enzymes in the blood and duodenal contents, roentgen examination with special reference to the pancreas and examination of the glucose tolerance curve.

Wiener klinische Wochenschrift, Vienna

62:837-856 (Nov. 10) 1950. Partial Index

Concentration of Various Preparations of Penicillin in Blood. R. Janke and A. Wiedmann.—p. 837.
*So-Called Eosinophilic Granuloma of Bone and Its Relationship to Hand-Schüller-Christian's Disease. K. Pretl.—p. 841.
Significance of Extrarenal Factors in Diseases of Kidneys. H. Axenfeld. —p. 845.

Eosinophilic Granuloma of Bone.—Pretl reports for the first time in Austria the occurrence of eosinophilic granuloma of the left and right parietal bone respectively, in a man aged 40 and a woman aged 19. The disease occurs predominantly in juvenile persons and children. The lesions are usually solitary, but multiple lesions were observed in about one fourth of the cases. The vault of the cranium, ribs, pelvic bones and long medullated bones are the usual sites of osteoclastic foci, which sometimes rapidly increase in size. The roentgen appearance of eosinophilic granuloma may be indistinguishable from sarcoma. Spontaneous recovery may occur, and the lesions respond well to roentgen irradiation. A third patient is reported, a boy aged 3, with eosinophilic granuloma or early stage of lipoid granulomatosis of the mastoid process of the temporal bone, with features of chronic, recurrent mastoiditis and otitis media. Surgical intervention for "chronic mastoiditis" revealed proliferation of granulations. The presence of moderate amounts of cholesterol in some of the fatty granular cells suggested Hand-Schüller-Christian's disease. Roentgenologic examination revealed additional foci in the parietal bone, in one rib and in the humerus. The child also had diabetes insipidus. This case proves the interrelation of eosinophilic granuloma of bone, Letterer-Siwe's reticuloendotheliosis and Hand-Schüller-Christian's lipoid granulomatosis. It should be classified as a case of Hand-Schüller-Christian's disease. Similar cases, particularly cases with lesions outside of the bones, should be classified as "forme fruste" of lipoid granulomatosis and not as eosinophilic granuloma despite the microscopic picture, which is similar to that of eosinophilic granuloma. The etiology and pathogenesis of the three mentioned diseases is still obscure. Eosinophilic granuloma is considered a benign process, while the two other diseases are usually fatal. Their differences as well as their interrelation may be understood best from the allergic point of view.

62:857-872 (Nov. 17) 1950. Partial Index

*Observations on Reoperation and Necropsy After Vagotomy. F. Mandl. —p. 857.
Effect of High Frequency Sound Waves on Blood with Respect to Its Therapeutic Application. W. Bejdl.—p. 859.
Skin Transplantation in Modern Treatment of Burns. H. Zehetner and E. Meister.—p. 864.

Observations on Reoperation and Necropsy After Vagotomy.—Mandl reports on 15 patients subjected to vagotomy for gastric or duodenal ulcer, five of whom were subjected once more to laparotomy for various other reasons and 10 of whom died and were subsequently studied at necropsy. Death result from ulcer in only one of the latter and from other conditions in nine. Comparison of observations at the time of vagotomy with those at the time of reoperation or necropsy showed that in three patients healing of the ulcers had not occurred. The reason for the failure of the vagotomy could not be determined. In all the other cases, the ulcer was no longer present, was diminished in size, or had become epithelized or cicatrized. The author's experience with vagotomy on 270 patients suggests that this procedure may be preferred to total resection or to Kelling-Madlehner's operation in patients with ulcer adjacent to the cardia. Resection combined with vagotomy is advisable in patients with gastric ulcer because this method insures the elimination of the secretory and neurogenic phase of the production of hydrochloric acid. Gastrectomy is the method of choice for ulcus ventriculi. Vagotomy combined with gastroenterostomy is preferred to gastrectomy in duodenal ulcer. Vagotomy is the method of choice for peptic jejunal ulcer. Perforation of an ulcer requires suturing of the opening followed by vagotomy with or without gastroenterostomy; vagotomy seems to prevent a secondary operation. Vagotomy is recommended for relief from pain in cases of inoperable carcinoma of the stomach.

BOOK REVIEWS

Clinical Nutrition. Edited by Norman Jolliffe, M.D., F. F. Tisdall, M.D., and Paul R. Cannon, M.D., for Food and Nutrition Board of National Research Council. Cloth. $12. Pp. 925, with 127 illustrations. Paul B. Hoeber, Inc. (Medical Book Department of Harper & Brothers), 49 E. 33rd St., New York 16, 1950.

The present textbook meets a critical need as an illustrated, authoritative reference in the area of clinical nutrition. Nutrition has been cited often by outstanding medical authorities as the most important environmental factor in human health. There can be no doubt that it is also one of the most basic, complex and rapidly moving areas of medical research. Hence, an up-to-date reference work, prepared by contemporary research authorities and including an excellent selection of color photographs to illustrate both moderate and severe deficiencies, makes a noteworthy contribution.

The authors (36 in number) have written from a background of extensive research and clinical experience combined with a broad outlook in terms of preventive medicine. The book is organized in three main sections dealing, respectively, with (*a*) diagnosis of nutritional deficiency (179 pages), (*b*) the availability and functional role of individual nutrients (441 pages) and (c) therapeutic and preventive practices (299 pages). The three principal authors participated in the preparation of several chapters in addition to meeting their responsibility for general organization and editing of the text. A further check on the reliability, coverage and general quality of the manuscripts was provided by submitting draft copies to members of the Food and Nutrition Board of the National Research Council for review.

Each chapter (31 in all) is accompanied by a carefully selected bibliography and liberal numbers of tables and figures from recent publications. The authors should be commended for doing a difficult task well, despite the fact that they have dealt with subject matter of great complexity and in an area in which there has recently been definite divergence of opinion.

Researches in Binocular Vision. By Kenneth N. Ogle, Ph.D., Research Consultant in Section on Ophthalmology, Mayo Foundation and Mayo Clinic, Rochester, Minn. Cloth. $7.50. Pp. 345, with 182 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W.C.2, 1950.

"Binocular vision is the coordinated behavior of the two eyes by which a single perception of external space is obtained and by which its greatest achievement, the specific sensation of stereoscopic depth perception, is made possible." This definition, from the introduction, is the result of the researches made on the extent and the manner of coordination of the two eyes for production of single binocular vision and the sensation of depth perception.

Studies in psychology of vision, physiology of vision and ophthalmic optics must be coordinated in an effort to explain the sensory and motor responses to visual stimulation. Much of the original research was done by the author and his colleagues at the Dartmouth Eye Institute at Hanover, N. H., prior to the termination of its activities July 1, 1947. Researches done elsewhere and not previously made available in the English language are commented on and incorporated in the discussion wherever pertinent.

The four parts of the book deal more specifically with the fundamental processes involved in binocular vision. The first part deals with the organization and sensory cooperation of the two retinas and the following parts concern the fusional processes in binocular single vision, the problems in binocular vision when changes are made in the relative magnifications of the images of the two eyes and the experimental and theoretical bases for aniseikonia.

In the clinical practice of correction of errors of refraction and disturbances of ocular motility, one is confronted with problems of sensitivity to differences in the function of the two eyes with regard to acuity of vision, dominance, individual and group muscle stabilization and pulling power and differences in size images. These problems become serious when they produce symptoms that interfere with normal eyesight, and they are not fully understood, nor are they always corrected by means at our disposal.

The character of the researches carried on by the author and his colleagues is sufficiently described for one to realize the originality of the various tests and procedures and to be oriented in the particular function under examination. Yet the book is not padded with mathematical computations. The illustrations, graphs and tables are clear and concise and augment the text where words alone would be inadequate. While the book is concerned with pure research in a fundamental science, it is helpful to clinical operators in the ophthalmic field, particularly in orthoptics and clinical refraction.

Modern Practice in Dermatology. Edited by G. B. Mitchell-Heggs, O.B.E., M.D., F.R.C.P., Physician-in-Charge, Skin Department, St. Mary's Hospital and Medical School, London. Cloth. $12.50. Pp. 836, with 319 illustrations. Paul B. Hoeber, Inc. (Medical Book Department of Harper & Brothers), 49 E. 33rd St., New York 16, 1950.

This volume is designed to serve as a combined manual and textbook of dermatology for the practitioner, and the editor has not forgotten that in these days the practitioner may find himself in military, public health or industrial medicine as well as in general practice. Chapters on the commoner skin diseases encountered in temperate and tropical climates, as well as discussions on industrial, social and public health problems, have been contributed by 41 authors from teaching institutions in Great Britain, Canada, Australia and South Africa. Most of the authors are dermatologists, but significant contributions have also been made by specialists in pathology, pharmacy, allergy, industrial medicine and zoology. The result is an authoritative presentation of material in a varied style, often conversational. This along with the excellent composition and typography of the book makes a very readable symposium. The occasional duplication of material by different authors serves only to emphasize the commoner diseases and lends perspective to the discussion.

In general, related topics and chapters are grouped systematically in the book, but this grouping and its logic are not sufficiently emphasized in the table of contents. A good index is provided. The material in the majority of chapters is sufficiently complete to serve as an adequate guide to diagnosis and treatment by the practitioner, but in a few cases reference to one of the more complete works in dermatology will be required. The photographs, of primary importance in a dermatological text, are excellent. This book should prove interesting and helpful to medical students as well as practitioners.

A Textbook of Gynecology. By Arthur Hale Curtis, M.D., and John William Huffman, M.D., Associate Professor of Obstetrics and Gynecology, Northwestern University Medical School, Chicago. Sixth edition. Cloth. $10. Pp. 799, with 466 illustrations, chiefly by Tom Jones. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W.C.2, 1950.

This is the first edition in which Curtis shares the responsibility of the book with a younger associate. The preface of the new edition says, "There has been a painstaking detailed review and revision of all chapters. Changes have been made throughout with searching care." In spite of this, a random comparison of numerous pages in the new edition with corresponding pages, not only in the fifth edition but also in the fourth edition, published in 1942, shows a large number of the pages to be absolutely identical. The 1942 edition stated that there were less than 250 cases of dysgerminoma reported in the literature, and the same statement is made in the 1950 edition. There is no section on psychosomatics or on the psychology of women. In fact, these terms do not even appear in the index. The only mention of psychic disturbances is that associated with amenorrhea, and all the data concerning this occupy less than

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V 14
1951

four lines. Every textbook on gynecology should now have a section on the psychology and psychotherapy of women.

The preface states that new material has been added on the paraurethral ducts, but the new data, including a drawing, occupy less than a page. Some new illustrations have been added, chiefly photographs and photomicrographs. Perhaps the junior author felt that Curtis' book did not require much revision. This is probably true, because Curtis' book was and still is one of the outstanding books on gynecology, but the preface should not emphasize detailed revision. The publishers have done their part most satisfactorily. The book is well printed, the illustrations are beautifully reproduced and most instructive and the book is well bound.

Die Röntgenbildanalyse: Eine röntgendiagnostische Anleitung für Studierende und Ärzte. Von Prof. Dr. Erich Saupe. Second edition by W. E. Baensch, M.D., Professor der Röntgenologie am Georgetown University Medical Center, Georgetown University Hospital, Washington, D. C. Cloth. Pp. 244, with 224 illustrations. Georg Thieme Verlag, Diemershaldenstrasse 47, Stuttgart-O, 1949.

Röntgen-Reihenuntersuchungen des Brustkordes unter besonderer Berücksichtigung der Erfassung der Lungentuberkulose. Herausgegeben von Obermedizinalrat Dr. Rolf Griesbach. Bearbeitet von A. Brandt, et al. Cloth. 41.40 marks. Pp. 503, with 232 illustrations. Johann Ambrosius Barth, Salomonstrasse 18B, Leipzig C1, 1949.

Röntgenatlas der Erkrankungen des Magendarmkanals und der Gallenblase: Ein Leitfaden für Ärzte. Von Prof. Dr. Fritz Kuhlmann, Chefarzt am L.V.A.-Krankenhaus Mölln/Lauenburg, und Dr. Bernhard Rating, Chefarzt am Städt. Krankenhaus "Haniels-Krankenstiftung" Duisburg-Ruhrot. Cloth. 20 marks. Pp. 212, with 181 illustrations. Urban & Schwarzenberg, Thierschstrasse 11, München 22; Meinekster, 13, Berlin W. 15, 1950

Lehrbuch der röntgenologischen Differentialdiagnostik. Band I: Erkrankungen der Brustorgane. Von Werner Teschendorf. Second edition. Cloth. 84 marks. Pp. 779, with 865 illustrations. Georg Thieme Verlag, Diemershaldenstrasse 47, (14a) Stuttgart-O; Agents for U. S. A.: Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1950.

Lehrbuch der röntgenologischen Differentialdiagnostik. Band II: Erkrankungen der Bauchorgane. Von Werner Teschendorf. Second edition. Cloth. 72 marks. Pp. 608, with 1081 illustrations. Georg Thieme Verlag, Diemershaldenstrasse 47 (14a) Stuttgart-O; Agents for U. S. A.: Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1950.

These are five recent books from Germany pertaining to roentgenologic diagnosis. They are in German and were written and published in Germany, although the book entitled "Röntgenbildanalyse" has been newly worked over by Baensch, who now practices radiology in Washington, D. C. These books are brilliant examples of the printer's and lithographer's art. The reproductions of radiographs are marvelously sharp. It is amazing to find in these books the same brilliancy of print and picture that characterized German medical books before World War II. "Röntgenbildanalyse" was originally written by Erich Saupe, of Dresden, in 1942, then reedited and revised by Baensch in 1948. Readers of English are familiar with a similar text by Alban Koehler, of Wiesbaden, which had several editions. This is not an atlas wherein one might seek a picture that corresponds with some problem film; rather, this book attempts to show how one must analyze a film to arrive at sound diagnostic facts and etiological evidence. The book is not large, but in the first 43 pages there is much crisp discussion of some important moot points in roentgen diagnosis and technic. Then the appendix covers with startling brevity and typical Prussian acuity the subjects of how one studies roentgenology, the position of roentgenology in medicine and advice on the organization of a roentgen institute. There is no indication of how much credit Baensch deserves for possible amplification of Saupe's original text. But one might inquire whether Baensch is considering an English translation, as the present active generation of American physicians has not had good reason to learn the German language.

The second book is a lengthy volume on serial radiography, fluororadiography and mass roentgen studies of industrial workers and population areas and is devoted to descriptions of technic, apparatus and statistics. A formidable array of physicists and tuberculosis specialists and one roentgenologist have written the major portion of the book. The only interpretations of illustrations are on pneumonoconiosis, and are of doubtful value.

The small "Röntgenatlas of Diseases of the Gastrointestinal Tract and Gallbladder" has large, beautiful illustrations, accompanied with only a minimal description of symptoms and analytical interpretation. In most cases the diagnosis seems obvious, but then the book is offered as a guide to general practitioners only rather than radiologists.

The volumes on the differential diagnosis of diseases of the thoracic and abdominal organs contain excellent, sharp lithographs, with good legends. This tremendous text was completed in 1949. Teschendorf's larger volume, on thoracic organs, has about 500 pages on pulmonary pathology, 200 on the heart and smaller sections on the esophagus and the diaphragm. The author supports the text with many references to contemporary roentgenology literature, and footnotes with recent dates and innumerable American sources. The author's classification and diagnosis of tuberculous pulmonary manifestations are developed extensively and with finality. There is a fine chapter on the normal lung roentgenogram in the presence of congenital deformity, scoliosis, rickets and many other systemic variation factors. The chapters on lung tumors, acute infections, dust diseases and chronic or residual disease other than tuberculous are well done and contain many fine illustrations of extraordinary clarity and contrast. Even histoplasmosis and spore diseases receive attention, though the author says that these diseases were brought back to Germany by prisoners of war in foreign countries. There are innumerable instances of *Schichtaufnahme* or layer technic (tomography).

Teschendorf's volume on the abdominal examinations has many excellent reproductions that rival the English roentgen illustrations. Aside from the good coverage of the usual deforming diseases of the gastrointestinal tract, one can find satisfaction in the pages on lesions at the cardiac end of the stomach and the postoperative roentgen examination of the stomach and intestines. It is reasonable to expect more difficulty in the interpretation of roentgenograms showing defects due to disease or superimposed operation. Modern radical surgery, much of which depends on refinements of the roentgen diagnostic examination and advanced anesthetic technics, demands more from the radiological department in evaluation of results of such radical operations and in decisions with respect to further surgical intervention. There are, surprisingly, 15 pages on the vermiform appendix, which has almost been forgotten in American textbooks as far as the radiological examination is concerned. The many illustrations and the physiopathological discussions of appendiceal pathology are illuminating and worthy of attention. This volume ends with a good chapter on the genitourinary system and a fair chapter on that dwindling field of pneumoperitoneum.

These five books should be impressive to those capable of reading them in the original German. Even without a knowledge of German, the legends are easily translated if one remembers some Latin.

Radiation Therapy in the Management of Cancer of the Uterine Cervix. By Simeon T. Cantril, M.D., Director, Tumor Institute of Swedish Hospital, Seattle, Washington. Publication number 55, American Lecture Series, monograph in American Lectures in Radiation Therapy, edited by Milton Friedman, M.D., Associate Professor of Radiology, University Hospital, New York University-Bellevue Medical Center, New York City. Cloth. $5. Pp. 196, with 25 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 49 Broad St., Oxford, England; The Ryerson Press, 299 Queen St., W., Toronto 2B, 1950.

The author, with the help of his wide experience, has compiled a concise monograph presenting the knowledge essential for a rational and effective approach to the control and cure of cancer of the uterine cervix. The one essential missing is the leavening of experience and judgment that can be supplied only by the individual therapist. The salient clinical facts of cervical carcinoma are enumerated; the histological characteristics and the modes of dissemination of the tumor are outlined, and the common complications of the disease are discussed. The major portion of the book deals with the treatment of cancer of the uterine cervix by radiation. The Stockholm and the Paris technics are discussed as the prototypes of all successful methods of radium application; by restriction of discussion to these classic technics, the danger of losing principles in a morass of detail is avoided. The newer transvaginal roentgen therapy is given fair consideration. The use of external radiation to supplement the parametrial dosage is described.

Emphasis is placed on the importance of individualization of treatment, but the complications and tragedies incident to this individualization in the absence of judgment and experience are covered at length. An extensive survey of results from European and American centers is presented in numerous tables. A chapter is devoted to the position of surgery in the management of the disease. The extensive bibliography and the two appendixes, one giving the 1937 League of Nations clinical staging, the other discussing dosage distribution within the pelvis, should prove useful for reference. Anyone with patients with cervical cancer should find that this book makes worth while reading.

Penicillin: Its Practical Application. Under General Editorship of Professor Sir Alexander Fleming, M.B., B.S., F.R.C.P., Principal, Wright-Fleming Institute of Microbiology, St. Mary's Hospital Medical School, London. Second edition. Cloth. $7. Pp. 491, with 63 illustrations. C. V. Mosby Company, 3207 Washington Blvd., Saint Louis 3; Butterworth & Co., Ltd., 4-6 Bell Yard, Temple Bar, London, W.C.2, 1950.

It is completely fitting and proper that the man who discovered penicillin should edit the second edition of a book about this drug. The first edition of the book was published in 1946. Knowledge of the usefulness and limitations of penicillin has increased greatly since that time, and Fleming has endeavored to portray the present day status of the drug in this edition. The authors of the various chapters have rewritten their sections, but some did not appear to carry out a sufficiently critical review or to take into full account all the published literature as they should have done. This is apparent when one notes the meager bibliography following certain chapters. The topical use of penicillin preparations is given undue prominence, and the hazards of such use are not given sufficient consideration. Some reduplication of observations concerning the use of penicillin occur, but this is not at all unusual in a text written by a number of men.

Trophic Nerves: Their Role in Physiology and Pathology with Especial Reference to the Ætiology of Malignant, Neurological and Mental Disease and Inflammatory and Atrophic Changes. By R. Wyburn-Mason, M.A., M.D., B.Ch. Cloth. 75s. Pp. 1083, with 69 illustrations. Henry Kimpton, 25 Bloomsbury Way, London, W.C.1, 1950.

This weighty volume deals with the subject of an old controversy regarding the existence of nerve fibers that govern the nutrition and regulate the relative growth rates of different parts of the body. According to the preface, the existence of such fibers was accepted for a period of about 50 years but then the idea fell into disrepute. The preface promises to bring forward "a mass of evidence" to show that trophic nerves exist and advises that one read the book twice. It is possible that this process might indeed yield something, but the first reading fails to locate either a formal definition of the author's concept of a trophic nerve or a summary of his proof of the existence theorem. Neither is there an indication that practical consequences of any value follow from the author's work, for the case histories in the appendix suggest little in the way of treatment beyond bed rest and administration of atropine and sedatives. This book can be recommended only to neurologists.

Manson's Tropical Diseases: A Manual of the Diseases of Warm Climates. Edited by Sir Philip H. Manson-Bahr, C.M.G., D.S.O., M.D., Consulting Physician to Hospital for Tropical Diseases, London. Thirteenth edition. Cloth. $9. Pp. 1136, with 475 illustrations. William Wood & Company, Division of Williams & Wilkins Company, Mount Royal and Guilford Aves., Baltimore 2, 1950.

This edition marks the fiftieth anniversary of the book and stands as a tribute to its wide acceptance as a compact, comprehensive and authoritative guide to practitioners of medicine in warm climates. It covers most of the advances in the management of tropical disease that have occurred since World War II.

The general plan of the book remains unchanged. It retains important information regarding the influence or lack of influence of tropical climate on diseases frequently encountered in temperate zones. This feature is one not emphasized to an equal degree by other manuals and reference works on the subject. Certain misconceptions are properly dispelled concerning supposed peculiar effects of the tropics. British preference in terminology, spelling and remedies is retained, for obvious reasons. This does not detract from the usefulness of the manual but changes the emphasis in some instances. Although other antibiotics are discussed, penicillin is the only one made the subject of a special section. Nearly all the generally available and useful drugs are listed in a special table at the end of the clinical part of the book. The appendix of specialized information on protozoology, helminthology, entomology and clinical pathology provides convenient technical information for the clinician and laboratory assistant.

The book is bound for convenience in a size consistent with the comprehensive handling of the subject. The typography is good. The index is carefully constructed and lists principal page references in boldface. Practitioners of medicine in the tropics should welcome the new edition of this standard reference work on tropical diseases.

Praktische Elektrokardiographie: Extremitäten-EKG, Brustwand-EKG, Belastungs-EKG. Von Franz Kienle, Dr. med. habil., Dr. phil., Dozent für innere Medizin, Chefarzt der II. Med. Klinik der Städtischen Krankenanstalten Karlsruhe. Third edition. Cloth. 38 marks. Pp. 448, with 426 illustrations. Georg Thieme, Diemershaldenstrasse 47, (14a) Stuttgart-O, 1950.

This volume has missed the purpose claimed by the author in the introduction, namely, didactic orientation. The presentation is based mainly on the author's interpretation of the classic limb lead electrocardiogram. Precordial leads are described merely in an appendix to the otherwise voluminous text and illustrated in many instances only by schematic drawings of leads that are not in accordance with generally accepted standards. The discussion of the abnormal electrocardiogram is dominated by a subjective note. The author uses numerous, long and nebulous summaries (*Richtsaetze*), which are repetitious and confusing. There is complete disregard of electrocardiographic progress during the last decennium. The genesis of the normal and abnormal electrocardiogram is dealt with only on the basis of the differential theory. The vague attempt of the author to explain the syndrome of Wolff-Parkinson-White (preexcitation) by a delay of activation is difficult to understand. The illustrations are numerous, but a number of them are technically imperfect or, as in the case of arrhythmias (figures 44, 393 and others), incorrectly or superficially interpreted. The book may perhaps sometime in the future become valuable for the reader interested in the historical aspects of electrocardiography, but certainly it cannot be recommended to anybody interested in the present stage of the field.

Life Stress and Bodily Disease: Proceedings of the Association, December 2 and 3, 1949, New York, N. Y. Research publications, Association for Research in Nervous and Mental Diseases, Volume XXIX. Editorial Board: Harold G. Wolff, M.D., Stewart G. Wolf, Jr., M.D., Clarence C. Hare, M.D. Cloth. $15. Pp. 1135, with 345 illustrations. Williams & Wilkins Company, Mount Royal and Guilford Aves, Baltimore 2, 1950.

This book consists of a series of papers presented at a symposium, the underlying theme of which was the review and criticism of the methods of study, observations and prevailing concepts concerning man's reaction to stress. The first 68 chapters consist of contributions from specialists in a variety of disciplines, including psychiatry, psychology, internal medicine, physiology and biochemistry. These papers present data obtained from both animal and human studies and concern the following general topics: mechanisms involved in reactions to stress, the problem of specificity in bodily reactions during stress, life stress and disorders of growth, development and metabolism, and life stress in relation to various diseases. In the final chapter, Dr. Harold G. Wolff, the chairman of the symposium, has done a skilful job in integrating the various papers and presenting a provisional formulation. In this he stresses the importance to medicine of the recognition that for man reactions to threats or to symbols of danger, especially when sustained, may be more important than response to assaults. This book should appeal to those interested in the field of psychosomatic medicine and is particularly timely in view of the widespread interest in the so-called "diseases of adaptation," aroused by the introduction of pituitary adrenocorticotropic hormone (ACTH) and cortisone into clinical use.

V 14
1951

Pharmacological Basis of Penicillin Therapy. By Karl H. Beyer, Ph.D., M.D., F.A.C.P., Director of Pharmacological Research, Medical Research Division, Sharp and Dohme, Incorporated, Glenolden, Pennsylvania. Publication number 77, American Lecture Series, monograph in American Lectures in Pharmacology, edited by Chauncey D. Leake, Ph.D., Vice-President in Charge of Medical Affairs, University of Texas Medical Branch, Galveston, Texas. Cloth. $4.50. Pp. 214, with 35 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 49 Broad St., Oxford, England; The Ryerson Press, 299 Queen St., W., Toronto 2 B, 1950.

In this book, emphasis has been placed on the metabolism of penicillin with relatively brief mention of the bacteriologic aspects of penicillin therapy. Over 40 per cent of the volume is devoted to considerations of carinamide and benemid as adjuncts to penicillin therapy. The author is well qualified in this field, being the director of pharmacological research of Sharp and Dohme. The first part of the volume is devoted to a comprehensive review of the literature covering such subjects as the chemistry of penicillin; the factors influencing its absorption from the gastrointestinal tract, with an evaluation of antacid and enteric coated preparations; absorption from other routes of administration; blood and tissue levels, and the characteristics of excretion. An excellent feature is the thorough discussion of the relative merits of short-sustained high and of long-sustained low penicillin blood levels.

Practical Post-Mortem Technique: A Handbook for the Student Post-Mortem Technician. By Edwin G. Poynter, R.M.P., S.E.A.N., Post-Mortem Technician, Farnborough Hospital, Kent. Edited by Dr. Louis L. Griffiths, M.A., M.D., B.Ch., Consultant Pathologist to Farnborough Hospital, Kent. With foreword by John F. Hackwood, M.D., F.R.C.S., F.R.C.S.(E.), Surgeon Superintendent at Farnborough Hospital, Kent. Cloth. 9s. Pp. 118, with 42 illustrations. Henry Kimpton, 25 Bloomsbury Way, London, W.C.1, 1950.

This booklet is written by an experienced autopsy technician to provide student technicians with the necessary information. The material presented should enable the nonmedically trained layman to assist intelligently at an autopsy. The book contains, in easily readable language, information about anatomy and surface markings and the basic principles of anatomy and contour as well as a good description of the autopsy technic. In addition, it discusses the preservation of specimens for histological or bacteriologic study and for permanent museum mounts. The restoration of the body after the autopsy is well presented as are various medicolegal aspects, especially concerning autopsy permits. Some of the latter information applies to British rather than to American law. The material is well put together and provides exactly what an intelligent lay autopsy assistant should know. This booklet appears to fill a gap in medical literature.

Medical Dictionary. Dictionnaire médical. Medizinisches Wörterbuch. Editor-in-chief: Emmanuel Veillon, M.D., Cloth. $18.75. Pp. 496; 435; 476. Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1950.

This dictionary contains approximately 100,000 medical terms in current use. It is the result of many years of collaboration of the editor in chief with prominent international medical authorities and unites in a single volume three distinct medical vocabularies: English-French-German, French-German-English and German-English-French, arranged in three synoptic columns. While no modern dictionary can be complete, because of the unprecedented expansion of scientific and technical terms, this one does satisfy the basic requirements of research workers, scholars, translators and general practitioners wishing to keep abreast of modern thought in international medical literature.

Osteology for Dissectors: A Tutorial Pocketbook. By Robert King Howat, M.B., C.M., F.R.C.S., Hon. Demonstrator of Anatomy, King's College, London. Cloth. 15s. Pp. 292, with 46 illustrations. Henry Kimpton, 25 Bloomsbury Way, London, W.C.1, 1950.

This small book provides notes on osteology that may be used conveniently in the dissecting room as a guide or at home as a refresher medium. Included are well detailed descriptions of the vertebrae, ribs, sternum, extremities and skull. Line drawings of the bones discussed are clear and, although diagrammatic, are helpful to the student. In addition, the author has inserted throughout the text notes on soft tissues related to the osteology. For example, in discussing the metacarpals and phalanges, he includes an additional note on the small muscles of the hand. Four appendixes are included. The first discusses the action of voluntary muscle, the second provides some valuable points on the course of the femoral artery, the third adds some notes pertaining to the base of the skull and the fourth contains further detailed descriptions of the ethmoid bone.

The author remarks that "osteology has the reputation for being the driest and dullest department of anatomy." Nevertheless, the presentation is without much of the "inescapable dryness" and is clear and concise. This volume should be of value to students of anatomy.

The Practice of Medicine. By Jonathan Campbell Meakins, C.B.E., M.D., LL.D. Fifth edition. Cloth. $13.50. Pp. 1558, with 518 illustrations. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1950.

This is one of the best known textbooks in medical practice. As the author points out, the task of writing any new edition of a practice of medicine is becoming increasingly difficult, one of the most important reasons being the development of specialized technics. Thus details have been, in some instances, omitted in conformance with the technical capacities and facilities of the general practitioner. How to weed out the unessential from the essential for most of the daily practice is an overwhelming task. Needless to say, Meakins has done, as always, a more than creditable job. The latest edition of his book brings credit to himself and much material to its readers. It may not contain everything, as no one book can, but, on the other hand, it contains the essentials and in this respect provides a book in which the value of brevity has been recognized but from which nothing is lost because of the author's obvious attempts to keep wasted words to a minimum. This is a well written book in which careful attention has been given to type, paper and format. The index lacks little if anything: its completeness is one of the outstanding features of this book.

A Guide to General Medical Practice. By Martin G. Vorhaus, M.D., Attending Physician, Hospital for Joint Diseases, New York City. Cloth. $3.50. Pp. 244. The Macmillan Company, 60 Fifth Ave., New York 11, 1950.

The author of this book is a practitioner of many years' experience who attempts to prepare the young physician for the diagnostic and economic problems that will confront him in general practice. The subject matter includes brief references to the scope of general practice, the first office, fluoroscopic technics and an extensive section devoted to gastrointestinal diseases, constipation, headache, backache, hypertension, cardiac and psychosomatic problems. The book contains a third and final portion on adolescent tensions, premarital education, sexual activity, parent-child relations, the menopause and geriatric problems.

The treatment of the numerous subjects to which reference is made is exceedingly superficial. Few graduates of modern medical schools will derive any new information from the large section devoted to diagnosis and therapy of the common diseases. The section referring to some of the problems encountered in establishment of a general practice might have been worth while had it been expanded. In its present form it is so brief and superficial that students and interns will profit little from it.

Atlas typischer Röntgenbilder vom normalen Menschen: Ausgewählt und erklärt nach chirurgisch-praktischen Gesichtspunkten mit Berücksichtigung der Varietäten und Fehlerquellen sowie der Aufnahmetechnik. Von Dr. Med. Rudolf Grashey. Seventh edition. Cloth. 38 marks. Pp. 318, with 715 illustrations. Urban & Schwarzenberg, Thierschstrasse 11, München 2; Meinekestr. 13, Berlin W. 15, 1950.

Like Gray's "Anatomy" this book still carries many of the original sketches and skeletal roentgenograms, but more than 40 illustrations have been replaced by better ones. This edition has been dedicated to Dr. Fedor Haenisch, of Hamburg, who is an old friend of many American radiologists. This is an excellent roentgen anatomy, and the student does not need to be able to read German to study the skeletal reproductions and translate the numbered anatomic points, which are all designated by the universal Basle nomenclature. This book will serve as an international monument to Rudolf Grashey. A good textbook can always be read with profit and pleasure.

QUERIES AND MINOR NOTES

REACTIONS FOLLOWING USE OF INCOMPATIBLE BLOOD

To the Editor:—*What is the usual course following the administration of incompatible blood? Does the amount of blood administered affect the outcome of the case, and what are the anticipated complications? I am particularly interested in the mechanisms of hemorrhagic manifestations and jaundice, as well as pathological reports of the liver and kidneys. References would be appreciated.* *M.D., Indiana.*

Answer.—The administration of incompatible blood usually causes symptoms before too much blood is introduced, and, if the transfusion is stopped when symptoms first appear, no serious complications may result. The clinical symptoms are variable, and, in a mild reaction, they are characterized by a slight chill, restlessness, increased pulse and respiratory rate, generalized tingling sensations and pain in the back and thighs; this may be followed by a mild degree of transient jaundice and hemoglobinuria and a rise in temperature. Within 24 hours the urine will show hemoglobin in moderate amounts that will gradually disappear and mild icterus that will clear up within 24 to 48 hours (Wintrobe: Clinical Hematology, ed. 2, Philadelphia, Lea & Febiger, 1947). A severe reaction is characterized by severe rigor, a rise in temperature to 105 F. or higher, delirium, shock, pronounced, progressively deepening jaundice, hemoglobinuria, anuria and coma. The nonprotein nitrogen level rises gradually and within a few days reaches a rather high level. Death may occur as late as two to three weeks following transfusion of incompatible blood, and recovery has been reported as late as two to three weeks (DeGowin: *Ann. Int. Med.* **11**:1777, 1938; DeGowin, Warner and Randall: *Arch. Int. Med.* **61**:609, 1938).

Although the severity of the reaction does depend on the amount of blood administered, it also depends on other factors, chiefly the level and titer of incompatible antibody and antigen. Thus it is possible that a transfusion of 500 ml. of blood may be followed by only a mild hemolytic reaction, while in other instances as little as 50 ml. of incompatible blood will cause a very severe reaction.

Hemorrhagic manifestations may follow in the wake of rapid intravascular hemolysis, which results from grossly incompatible blood, aged stored blood, blood stored at an unsuitable temperature or in a solution not containing dextrose (Whitby and Britton: Disorders of the Blood, ed. 5, Philadelphia, the Blakiston Company, 1946). Blood destruction may be intravascular, in which case bilirubinemia, methemoglobinemia, hemoglobinemia and hemoglobinuria may each or all be found; or it may be extravascular, in wihch case only bilirubinemia occurs (Mollison: *Brit. M. J.* **1**:529, 1943). Clinical jaundice appears if the serum bilirubin exceeds 4 mg. per 100 ml.

The administration of incompatible blood may involve pathological changes within the kidney. The renal lesions caused by intravascular hemolysis are epithelial degeneration and necrosis of the tubules in the cortex and pigmented casts within the proximal and distal convoluted tubules and collecting tubules (Lucke: *Mil. Surgeon* **99**:371, 1946). Mechanical blockage within the tubules may be dependent on the action of a toxic, chemical or vascular factor and the alteration of the hydrogen ion concentration of the urine in increasing the precipitation of hemoglobin in the renal tubules (Yuile, Gold and Hinds: *J. Exper. Med.* **82**:361 1945).

Infectious hepatitis artificially spread by inoculation of blood or plasma from an infected person is termed homologous serum jaundice. Clinically and pathologically it simulates the naturally occurring infectious hepatitis, except that the incubation period is about three months. In nonfatal cases results of liver biopsy show focal areas of necrosis in the central parts of the lobules. In fatal cases there is a massive destruction of hepatic cells and the liver is greatly reduced in size and weight. The severity of the jaundice noted clinically is not correlated with the degree of hepatic destruction (Lucke: *Am. J. Path.* **20**:471, 1944; Lucke and Mallory: ibid. **22**:867, 1946).

CONVULSION THERAPY

To the Editor:—*What type of convulsion therapy did Dr. L. J. Meduna of the University of Illinois develop in 1934? Is he at present using any method of treatment of the psychoses that differs from standard procedures used elsewhere?*

B. Hardy Carlton, M.D., Freeport, Texas.

Answer.—Meduna developed pentylenetetrazole (metrazol®) shock therapy in 1934. This has since been supplanted almost entirely by electric shock therapy. At present Meduna is using carbon dioxide therapy in treating some of the neuroses, but he has found this method of no value in the psychoses. A search of the literature reveals no publication by Meduna concerning a method of treatment of the psychoses that differs from procedures used elsewhere.

NO MEDICINE CAN REPLACE INSULIN

To the Editor:—*Is there a medicine that a diabetic can take without taking insulin injections? I have been told there is something one can take by mouth.*

J. O. Helm, M.D., New Florence, Mo.

Answer.—There is no medicine that can replace insulin in the treatment of diabetes, and as yet no form of insulin is known that is effective when taken by mouth.

DISCOLORATION OF URINE ON ADDITION OF SULFOSALICYLIC ACID

To the Editor:—*What is the significance of a reddish discoloration in a urine specimen with a p_H of 4.5, on addition of a solution of sulfosalicylic acid, standard for tests for albumin? Such discoloration has been observed in strongly alkaline urine specimens as well. Is there any connection with the porphyrin metabolism?*

R. J. Kent, M.D., Savannah, N. Y.

Answer.—Sulfosalicylic acid forms a red color with several metallic ions, but the only one that could possibly be present when a test for protein in urine is made is ferric ion. The minimal concentration of iron in solution that will give a red color with 20 per cent sulfosalicylic acid is about 1 mg. per 100 cc. This concentration is far higher than is ever seen in urine even after intravenous injection of iron preparations. On the other hand, sulfosalicylic acid often contains iron as an impurity. It is conceivable that when such an impure preparation is added to a urine specimen containing iron, the total ferric ions present may be enough to produce a red color. There are two other possibilities. Old solutions of sulfosalicylic acid become red by oxidation, especially the dried crusts at the neck of the bottle. This may be washed into the urine specimen. Also, the urine specimen may be contaminated with iron from a metal container top.

In the rare disease porphyria the quantity of porphyrins in the urine may be great enough to give a pronounced red fluorescence when the urine is acidified. If the prophyrin-containing urine is alkaline and has been exposed to sunlight or fluorescent light, acidification with sulfosalicylic acid may bring out the reddish fluorescence. But this phenomenon will occur with the addition of any acid.

The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any official bodies unless specifically stated in the reply. Anonymous communications and queries on postal cards cannot be answered. Every letter must contain the writer's name and address, but these will be omitted on request.

V 14
1951

KERATITIS FOLLOWING REMOVAL OF CATARACT

To the Editor:—*A patient aged 78 who had a cataract removed subsequently had punctate keratitis. His tonsils are badly infected, but his age makes tonsillectomy undesirable. Antibiotics, locally and parenterally administered, salicylates, antihistamine preparations and sodium propionate have not helped his vision. Would pituitary adrenocorticotropic hormone help in punctate keratitis? If so, what dosage is advised?*

L. R. Evans, M.D., Laramie, Wyo.

Answer.—Superficial punctate keratitis is a term used that probably encompasses a large number of different conditions. When superficial corneal changes occur after cataract extraction, they are probably degenerative rather than infectious in nature. Recent indications are that the use of the adrenocorticotropic hormones may have a transitory, beneficial effect in various corneal degenerations following cataract extraction. The results, however, apparently are transitory, and the condition recurs after the use of these agents is terminated. Pituitary adrenocorticotropic hormone (ACTH) then would probably not be indicated, because the treatment could not be sustained over a long period. It has been shown that the local use of cortisone has an equally beneficial effect. Locally applied cortisone is best used in a 25 mg. per cubic centimeter concentration in a buffer phosphate vehicle with benzalkonium (zephiran®) chloride. Cortisone can be used locally every three or four hours for the first week, and if a beneficial result is obtained, one drop should be instilled in the conjunctival sac two or three times a day. Side effects are unusual, and the treatment can be maintained for some time. Cortisone ophthalmic ointment has also been used locally.

"FORAGE" FOR RHEUMATIC DISEASES

To the Editor:—*In a small clinic in Le Mans, France, operations have been performed on patients with chronic rheumatism with what appear to be good results. When I visited this clinic, Dr. André Cretin, who developed this operation, showed me two patients, one of whom had undergone operation two weeks previously. She had returning motion of all joints, and she said that the pain had disappeared within 24 hours after drainage. The second patient was a priest who was to be operated on that morning. All joints were swollen and deformed and almost rigid. I saw the operation, which consisted of drainage of the ends of the long bones, such as the head of the tibia and the lower extremity of the femur. Small holes were made in the hard bone, the marrow curetted and a rubber drain inserted, which was to remain in place from five to 20 days. Two weeks later it was reported that pain had disappeared and that there was motion in this patient's knee and hip joints. With three years' experience in this type of treatment, Dr. Cretin reports excellent results in 65 per cent of cases. On inquiry it was learned that there were two patients with pulmonary embolism and one with cerebral embolism, two of whom died. This information is from memory and was obtained through the medium of the French language and so may not be entirely accurate. Has anything of this sort been tried in this country?*

Edward E. Williams, M.D., Naugatuck, Conn.

This inquiry was referred to two authorities, whose respective replies follow.—Ed.

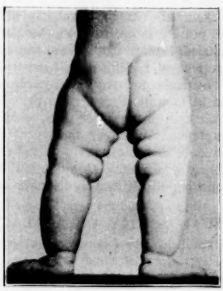
Answer.—The operation to which the inquiry refers is that of "forage," which was advocated by Noble Smith as early as 1890. Favorable experiences with such a procedure were described by Graber-Duvernay in 1932, 1933 and 1935. This method was reviewed by Dr. Slocumb (*Proc. Staff Meet., Mayo Clin.* **10**:501, 1935), who reported use of it by MaKenzie since 1931. Dr. Simpson (Painful Osteo Arthritis of the Hip: Surgical Treatment, *Proc. Staff Meet., Mayo Clin.* **12**:577, 1937) recounts his experiences with this procedure, noting lasting relief from pain in three of 12 cases of hypertrophic osteoarthritis of hips and lesser degrees of involvement in four other cases. The measure apparently has been used in hypertrophic and rheumatoid arthritis. Results have been sufficiently variable to preclude any considerable acceptance or systematic study of the procedure. There is great skepticism regarding its value.

Answer.—Forage, or bone drilling, is not new. In this country "lasting relief from pain" in three out of 12 was reported. In 16 cases of "acute monarticular inflammation" results were said to be excellent in seven, good in two, fair in four and poor in three (Hipps, H. E.: A New Surgical Procedure in Acute Infectious Arthritis: Preliminary Report, *Texas State J. Med.* **34**:276-284, 1938).

In most patients treated by this method general anesthesia was employed. Many patients with rheumatoid arthritis who are subjected to surgical procedures under general anesthesia are temporarily relieved of their rheumatic disease to a varying degree. It is possible that the anesthesia rather than forage was a major factor in improvement in some patients reported to be improved by forage. Temporary splinting of the affected part after operation also may have contributed to the good results reported. Forage is not recommended today by most investigators in rheumatic diseases, for the treatment of rheumatoid arthritis, and seldom is it employed to treat degenerative joint disease.

ASYMMETRIC INFRAGLUTEAL CREASES

To the Editor:—*One of the signs of congenital dislocation of the hip is said to be asymmetry of the gluteal folds or creases. In the inspection of normal infants, I have found this asymmetry to be common. The accompanying illustration shows the extra crease in a normal infant. This asymmetry is so common in normal infants that it should not be listed as a sign of congenital dislocation of the hip.*



Jack Troy, M.D., Whiting, Ind.

Answer. — Asymmetry of the infragluteal creases and of the midthigh creases is not diagnostic of congenital dislocation of the hip. These findings are but one of a considerable group of diagnostic signs that point to alteration of growth, function or stability of the extremity. The presence of asymmetric creases should arouse the examiner's curiosity and occasion search for other evidence to verify or disprove the diagnosis. Prominence of the femoral head in the gluteal area, absence of resistance in the femoral region, restriction of abduction, shortening and telescoping are additional positive signs suggestive of congenital dislocation. Careful reading of roentgenograms is necessary for establishment of the diagnosis.

ALLERGIC DISEASES IN ISRAEL

To the Editor:—*I have been trying to find in the literature the incidence rate of allergic diseases in Israel, especially allergic bronchial asthma, and have been unsuccessful. I would appreciate any information you may have on this subject.*

Aubie Portigal, M.D., Los Angeles.

Answer.—Israel is a country whose climate and topography combine some of the features of Arizona and Southern California. Bermuda grass is the commonest cause of hay fever and asthma, and, according to Dr. M. J. Gutmann of Jerusalem, these diseases are not uncommon there. Other pollens that might cause allergy there are those from olive and citrus trees. The climate in general should be favorable to asthma. It should be helpful to infectious asthma, ideal for ragweed asthma, probably satisfactory for mold asthma and at least helpful for grass asthma. Evidently, no figures have been published on incidence, but the general incidence should not be high. A good report on this subject is by Gutmann: "The First Report on Hay Fever in Palestine" (*J. Allergy* **12**:182, 1941). One might obtain more information by writing to Dr. Gutmann, care of the Medical School, Jerusalem.

SUDDEN COLLAPSE OF A YOUNG BOY

To the Editor:—*A 16 year old boy has twice collapsed suddenly, at six month intervals. His mother reported that his temperature was 97 F.; pulse was slow, and he was clammy and pale. He is a healthy looking boy. His electrocardiogram was normal except for sinus arrhythmia. An intravenous pyelogram was normal. Results of urinalysis were normal except for 8 pus cells. The blood cell count, roentgenogram of the chest and heart shadow were normal, except perhaps for slight enlargement of the left border of the heart (possibly normal in view of the patient's age). Blood count, sedimentation rate and typhoid and undulant agglutinin tests were normal. Basal metabolic rate was —7. Fasting nonprotein nitrogen and creatine are normal. Fasting blood sugar was 87 mg. per 100 cc. Blood pressure readings average 142/58, and the highest reading was 150/50. What is the significance of leg pressure readings? Once the left leg was 178/90, another time it was 150/100. The right leg was 170/80; another time it was 146/108. What is the suggested diagnosis and treatment? His weight is 147 lb., and he is 69 inches (175.26 cm.) tall.*

A. L. Henrichsen, M.D., Van Nuys, Calif.

Answer.—Sudden collapse in a young person may be due to a vasovagal syncope; this may occur in persons with a normal cardiovascular apparatus, almost always when the patient stands or sits. A sensitive carotid sinus and postural hypotension should be excluded. The comparatively high systolic pressure with a high pulse pressure suggests that aortic regurgitation should be excluded. Interestingly, mitral stenosis may give rise to systolic hypertension, but this usually occurs later in life. Sudden attacks of ventricular tachycardia, asystole or auricular fibrillation may lead to fainting. Pressures in the lower extremities are always higher than in the upper ones, mostly because of the necessary compression of larger masses of muscle. Collapse may, of course, be due to extracardiac and extravascular causes, such as epilepsy equivalents. Consultation with an experienced cardiologist is the best lead to diagnosis and treatment.

VISUAL ACUITY OF A TEACHER

To the Editor:—*I have been asked to pass on the issuance of a certificate of good health and physical fitness to a substitute teacher who has a congenital pendulous, or rotary and horizontal, nystagmus. Her uncorrected vision is O.D., 20/200; O.S., 20/200 + 1. Corrected, it is O.D., 20/100 — 1 + 2; O.S., 20/60 — 2 + 1 + 1; O.U., 20/50. Her corrected near vision O.U. is J_8 at 14 inches, and J_5 at 8 inches. Her present prescription is O.D., 0 = + 2.50 x 180, O.S., — 0.75 = + 2.25 x 45. I would appreciate an opinion on whether this woman, who has been teaching second and third grade classes as a substitute, should be approved for a permanent appointment.*

Hartwick M. Adler, M.D., New Orleans.

Answer.—A visual acuity of 20/50 O.U. at 20 feet in a woman of 23 should be expected to give an equivalent near vision at 14 inches of 8 point type, or Jaeger 5. As her corrected near vision for this distance is Jaeger 8, or 12 point, her corrected vision for near is about 50 per cent poorer than that for distant vision. Jaeger 3, or 6 point, is read at 8 inches because of the magnifying effect of the shorter distance. The visual findings indicate that only the better eye is being used for near.

Professional textbooks are usually printed in 10 point, but footnotes and subsidiary material are in 6 point. The macular acuity must be at least 50 per cent better than the reading requirement to allow for adequate parafoveal function in reading. Consequently the correctable vision of primary and secondary school teachers should be at least 20/25 in the better eye, as only that acuity will permit the macula to read 4 point type. In view of this young woman's training as well as her visual handicap, her proper place would be in the teaching of sight-saving classes, for which she would seem to be especially well adapted.

AMPUTATION STUMP PAIN AND LOBOTOMY

To the Editor:—*A patient has had amputation stump pain for 20 years. He has had several operations, and the only remaining source of relief from pain appears to be from prefrontal leukotomy. Are there any unusual dangers or contraindications?*

M.D., Louisiana.

Answer.—Lobotomy has been used successfully for the relief of pain following amputation, but the results, as far as return to an effective social life and working ability are concerned, have not been good. Standard prefrontal lobotomy is too extensive. Too few patients have been treated by other psychosurgical means to permit a definite expression of opinion. Since there have been reports of relief of phantom limb pain following electroshock therapy, this might be tried first, followed by transorbital lobotomy and further shock treatment if necessary.

PREVENTION OF LOWER NEPHRON NEPHROSIS

To the Editor:—*A recent question in the Queries and Minor Notes column (J. A. M. A.* **144:***1047 [Nov. 18] 1950) raises the important question of the prevention of nephrotic anuria following prolonged operations. This problem was the subject of considerable study by several of us in Lincoln, Neb.; as a result a rather important observation was made by Dr. Frank Cole. It was discovered that postoperative anuria developed only in patients who had received several, serial transfusions of blood. This observation suggested that use of the same transfusion set to give serial transfusions introduces two possibilities of mismatchings.*

First, since it is not practical to cross match donor bloods against each other (in cases of multiple transfusions), the possibility exists that any two may react with each other if they should mix in the transfusion set. This possibility is increased as the number of serial transfusions is increased. To avoid this hazard it is necessary to be sure that the transfusion set is cleared of the previous donor blood and rinsed with saline solution before the next transfusion is started. The other, hypothetical, hazard attending multiple transfusions is that of intravascular reactions between incompatible donor blood in an exsanguinated patient. This is a difficulty for which we have no answer at present.

Although this is an example of post hoc . . . reasoning the results of its application have proved satisfactory. Since we have taken precautions to prevent mixing donor bloods in the transfusion tubing we have had no more nephrotic anuria. The elimination of this unpleasant and dangerous complication has been definite. Unfortunately the transfusion sets in popular use do not permit one to take this precaution without considerable effort. In the one type it means spending a bottle of saline solution with each transfusion. In the other it means using an entirely fresh transfusion set. Dr. Cole is reporting this observation in greater detail in the future.

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TUBERCULOSIS CULTURES AND ANIMAL INOCULATIONS

To the Editor:—*The criticism in* The Journal *of Dec. 16, 1950, page 1420, concerning an item in the July 22, 1950 issue, page 1127, on the use of cultures versus animals for tuberculous materials demonstrates once again the importance of adequate study of tuberculosis. Dr. Rouff's criticisms are fallacious. The favorable results obtained with guinea pigs and the unfavorable results with cultures when one uses inoculums from tuberculous patients being given chemotherapy is easily explained. As high as 50 per cent of cultures can be negative when patients are under treatment with certain chemical agents, and the laboratory should then be advised to remove such agents adequately before culturing. For the highly qualified tuberculosis specialist, cultures on a good diagnostic nutrient medium are much easier and less expensive to handle than animals, and they are easily read by competent laboratory personnel.*

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